The OIL AND GAS JOURNAL

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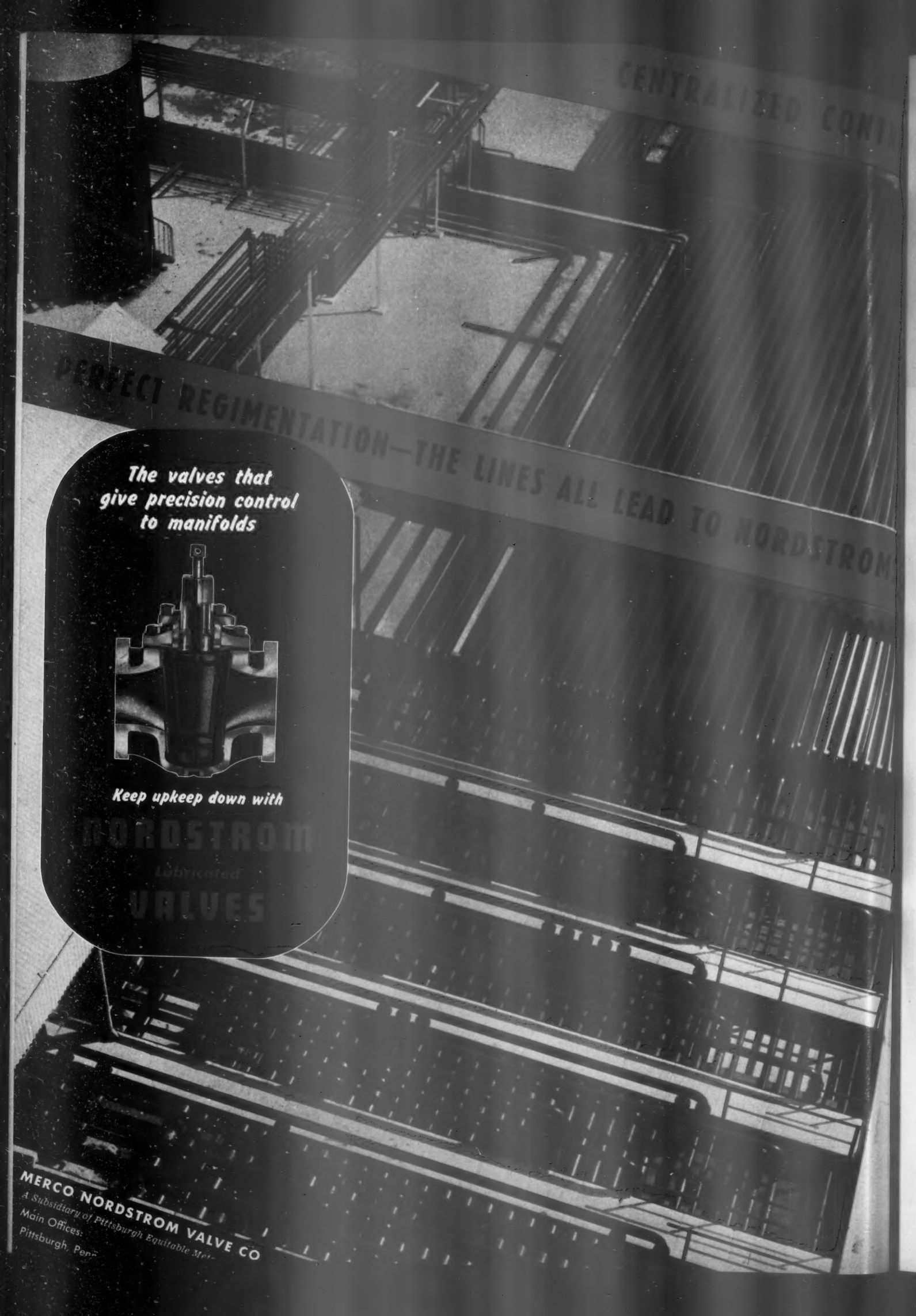
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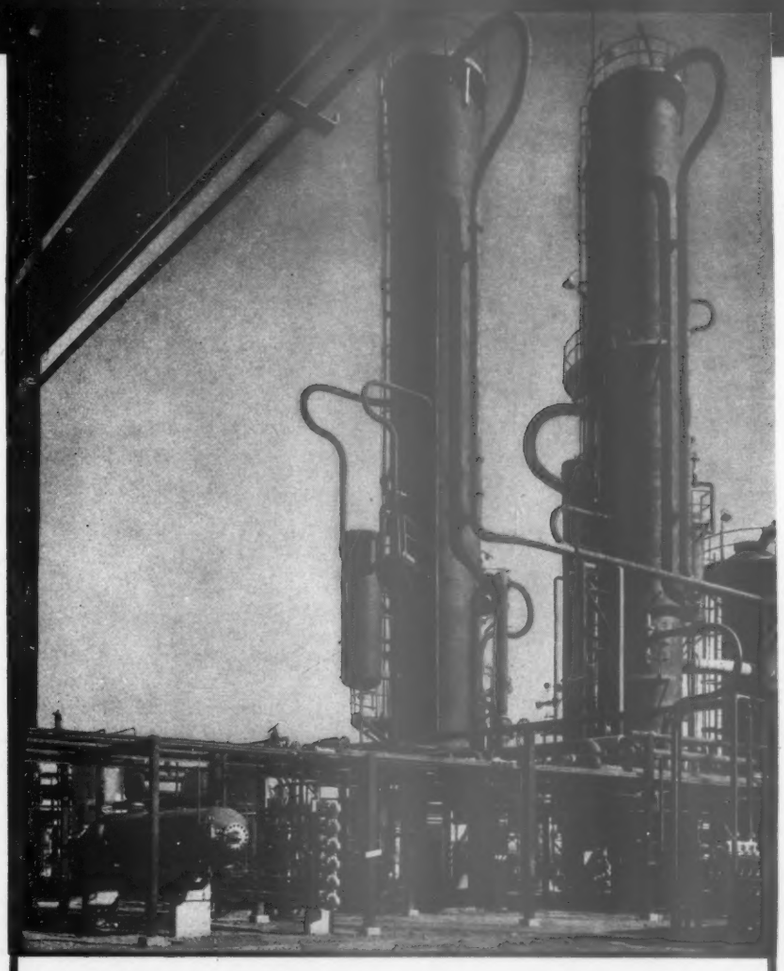
SMITHLINED VESSELS



Smithlined Vessels in the new Douglas Oil & Refining Company plant. Overall lengths range from 34'-6" to 74'-8"; inside diameters from 6'-0" to 8'-6"; wall thickness from 5/8" to 1 1/2".

THE proud, 600-year-old tradition of his Scottish ancestors is symbolized in the trade-mark that Donald Douglas—the airplane builder—chose for his "Flying Heart" gasoline.

It is fitting that this product should be associated with *another* trade-mark, which *also* symbolizes leadership and proud traditions—the *SMITHway* trade-mark on the four key vessels in the Fluor-built Douglas Refinery at Wilmington, California.

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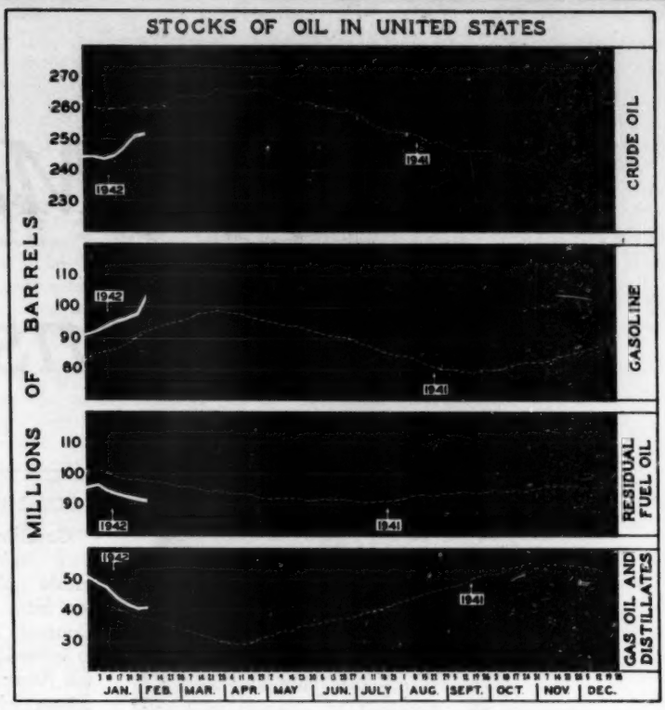
Trends

Foreign Developments Complicate Solution Of Domestic Problems



DOMESTIC operators the first of the week were endeavoring to determine the importance of a series of major developments. In foreign operations, most of the producing and refining properties in the East Indies have been lost by the Allies. This loss to the Japanese probably will bring some increase in demand in California. Because a large part of the East Indian oil production normally was consumed in a Pacific area now controlled by the Japanese, any increase in demand to operators in this hemisphere for the present will be much less than the 170,000 bbl. daily output which represented the level of operations previous to the start of the Nippon invasion.

CRUDE PRODUCTION *4,071,060 bbl. daily average—down 260,335 bbl. One year ago 3,611,065 bbl.*

CRUDE STOCKS *252,366,000 bbl. as of February 7—up 1,626,000 bbl. One year ago 260,250,000 bbl.*

GASOLINE STOCKS *100,224,000 bbl. as of February 7 — up 2,414,000 bbl. One year ago 93,801,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *90,859,000 bbl. as of February 7 — down 330,000 bbl. One year ago 97,479,000 bbl.*

GAS OIL AND DISTILLATES *40,038,000 bbl. as of February 7—down 36,000 bbl. One year ago 36,482,000 bbl.*

REFINERY RUNS *3,853,000 bbl. daily week ended February 7—up 5,000 bbl. One year ago 3,606,000 bbl.*

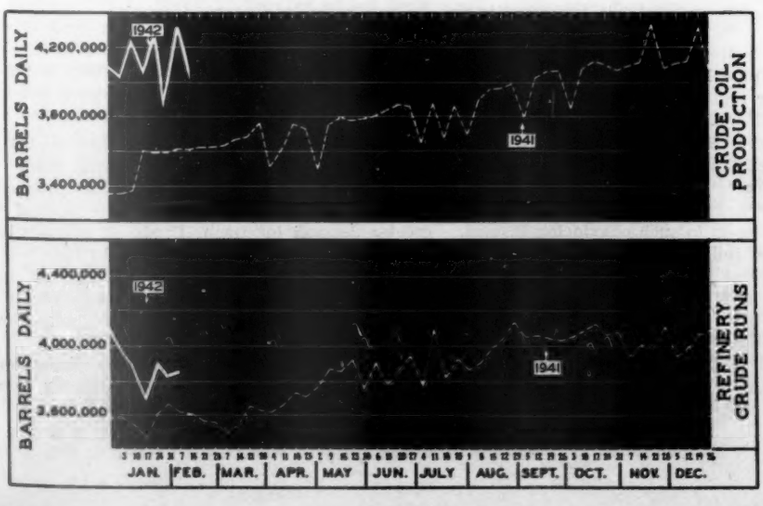
Note: A.P.I. figures for stocks of gasoline, residual fuel oil, gas oil and distillate, and refinery crude runs not available for week ending February 14.

The reported sinking of several tankers and the shelling of the world's largest refinery on the Aruba Island of the Netherlands West Indies, off the coast of Venezuela, has brought further complications to all oil areas fronting on the Caribbean Sea. This latest war threat will aggravate a domestic supply situation which was already rapidly becoming serious due to the recent attacks on Atlantic seaboard tankers. It was certain that oil shipments from the northern tier of South American countries including Trinidad and the West Indies refineries, and also the movement through the Panama Canal, will be greatly curtailed or stopped entirely until the enemy boats are driven out of the area. It is also assumed that movements from the Gulf Coast and Mexico will be further restricted for a time.

These developments pose so many problems that domestic operators and officials at Washington make no pretense of having all the answers. The attitude of operators is one of 100 per cent cooperation to any suggestions which will alleviate conditions with which producers and consumers are now confronted. The industry's position is typified by the Gulf Coast refiner who is shipping fuel oil to New England by tank car at a transportation cost of $1.40 with a delivered price for the oil of $1.45. While this is an extreme case it indicates the adjustments that must be made in prices in areas dependent on tank-car shipments in order to offset the greatly increased transportation charges. The pooling of all types of inland transportation is under way. Rationing in the East has been recommended and many believe that restrictions in civilian use in other sections will be necessary until existing transportation problems are solved. Markets for crude oil and refinery products are soft in areas where normal outlets are curtailed because of the transportation developments. Reductions in the allowable production of many fields in Texas is in prospect because of the reduced shipments from Gulf Coast refineries and terminals.

DAILY AVERAGE PRODUCTION FOR WEEK

	Feb. 14, 1942	Feb. OPC recommended production	February state allowables	Feb. 7, 1942
Arkansas	74,085	74,500	74,500	74,590
California	662,250	632,300	632,300	650,750
Eastern fields	111,300	111,400	.....	110,450
Illinois	339,140	371,800	.....	371,045
Kansas	249,900	251,700	251,700	246,700
Louisiana	357,725	335,000	344,955	364,550
North Louisiana	*80,130*	.....	.....	*80,700*
Louisiana Gulf Coast	*277,595*	.....	.....	*283,850*
Michigan	52,600	47,000	47,000	47,800
Mississippi	88,150	57,400	.....	83,525
Nebraska	4,400	5,200	.....	5,125
New Mexico	119,920	119,300	119,300	121,060
Oklahoma	393,000	395,300	395,300	408,200
Rocky Mountain states	115,940	104,900	.....	116,200
Texas	1,502,650	1,596,000	1,606,389	1,731,400
East Texas	*368,150*	.....	.....	*439,100*
West Texas	*300,050*	.....	.....	*353,400*
North Central Texas	*145,650*	.....	.....	*148,200*
East Central Texas	*89,550*	.....	.....	*95,750*
Texas Panhandle	*82,750*	.....	.....	*95,550*
Texas Gulf Coast	*419,750*	.....	.....	*489,300*
Southwest Texas	*96,750*	.....	.....	*110,100*
Total United States	4,071,060	4,101,800	.....	4,331,395
Total production, Jan. 1-Feb. 14, 1942		186,311,470 bbl.		
Same period last year		158,990,785 bbl.		



Rationing May Be Necessary, Ickes Warns at Hearing

By HENRY D. RALPH

WASHINGTON, D. C., Feb. 17.—A warning that rationing of gasoline may be necessary if other measures are not effective was given by Petroleum Coordinator Harold L. Ickes today, appearing before the petroleum subcommittee of the House.

Mr. Ickes said he hoped rationing would not be necessary but that his staff is studying the matter and is cooperating with the Office of Price Administration in preparing plans in case they become necessary.

The warning that positive rationing may be necessary was contained in a report read the committee by Mr. Ickes prepared at his request by a special committee of major company officials in the East, which stated that if rationing is necessary the industry prefers that it be done on the consumer-coupon system.

Will Ask for Pipe Line

Mr. Ickes announced definitely that he will ask the War Production Board to reconsider the action of SPAB last fall and grant priorities on steel to construct a 24-in. crude line from Texas to New York to handle some 350,000 bbl. per day.

Mr. Ickes endorsed the recommendations of the industry's committee but expressed hope that consumer rationing could be avoided. He stressed declining East Coast stocks in spite of recent large increases in tank-car movements, and said he feared even greater tanker shortage. He highly praised cooperation from the industry, and the committee complimented both him and the industry on this cooperation.

After hearing Mr. Ickes, the committee recessed until next week because of the illness of Chairman Cole, when it will hear members of the OPC staff on details of aviation gasoline, synthetic rubber, and other phases of the program.

At the conclusion of the coordinator's prepared statement, several members of the committee took up questioning with emphasis probably centering on the question of legislation that would remove operations of the OPC from the twilight zone to a full legal status. This line of questioning was pursued by Representatives Wolverton and Lea.

Coordinator Ickes said that such action probably would be desirable from a long-range viewpoint but reaffirmed his stand that he would not want to do anything now that would disturb the entirely satisfactory functioning of the oil industry.

Questioning on the desirability of legislation developed after Coordinator Ickes had given a brief summary of how his office had achieved the cooperation from the industry that drew high praise from the witness and from committee members. He outlined the industry committee setups, the Petroleum Industry War Council and the organization of his staff which he described as "the finest in Washington."

The coordinator's explanation of the relationship with the Justice Department by which approval is given for certain emergency actions such as pooling or exchange of products, loan and exchange of equipment, caused the committee members to probe the desirability of legislation. They doubted that it was within the province of the Justice Department and the OPC to determine what business functions could be justified simply because they were of an emergency nature. Coordinator Ickes agreed with the general attitude of the committee that actions necessary for prosecution of the war should be dignified by legislation if there is any doubt about the legality of the measures.

Representative Kelley of Illinois wanted to know if more pipe lines wouldn't be desirable. The coordinator replied that the main need now is for the steel with which to build the 24-in. trunk system from East Texas to the New York-Philadelphia refining area. The representative said that the War Production Board should certainly grant the steel now that the necessity for such has been shown in such convincing fashion.

Representative Holmes of Massachusetts asked if it would be best for the OPC to also handle rationing of oil, providing the necessity arose.

"Thanks for the compliment," replied Coordinator Ickes. "I don't want it."

Representative Lea of California wanted to know if more new wells should be drilled to assure an adequate supply of oil, apparently reflecting complaints of several operators that drilling has been slowed measurably by Conservation Order M-68.

The coordinator said that development of proven fields should be only on a conservative basis. He added that all government agencies, including OPC, the Bureau of Mines, U.S. Geological Survey and others were doing everything within their province to encourage discoveries. Coordinator Ickes explained that OPC would recommend that rationing be instituted by the Office of Civilian Supply if the need arose. He said that his staff and that of Leon Henderson, the price and supply administrator, had done much of the preliminary work on a rationing system that could be made effective on short notice.

The coordinator said that he hopes to lay down the oil job when the emergency is over and point to it as an outstanding example of what can be accomplished by cooperation in American industry. Earlier, he said that he had at first entertained slight misgivings over his ability to get the large oil companies and the small operators to "hold hands" but that he had found his fears entirely unjustified.

Ickes' Statement

Excerpts from Mr. Ickes' statement follow:

First—What is the situation?

Second—What is the Office of Petroleum Coordinator doing about it?

I think that some light may be thrown on the first question by reviewing the East Coast inventories as prepared both by the Bureau of Mines and the American Petroleum Institute. These figures show that our stocks of the four major petroleum items, crude, heavy oil, light heating oil and gasoline, amounted to 65,886,000 bbl. on December 13, 1941. This was 8,400,000 bbl. above the same date a year before.

Ever since then, stocks have been going down without interruption.

By January 17, the excess over last year was but 482,000 bbl. Then—suddenly—plus signs turned to minus signs, and by February 7, they had gone down to 5,705,000 bbl. below the supplies available on the East Coast a year before.

You will notice that the total stocks of the four products declined by 2,120,000 bbl. during the week ending February 7. Crude oil fell off during the week 1,067,000 bbl. and gasoline went down by 193,000 bbl. Light heating oil—the kind that is used for home heating—declined 644,000 bbl.; and heavy fuel oil—the oil that gives power to our industries—fell off by 216,000 bbl.

Now look at the next group of figures—those that compare the inventories today with those of a year ago. You will notice that all four products are below last year's levels in the face of a greater demand for them. Crude oil is down by 2,693,000 bbl.; gasoline by 543,000 bbl.; light heating oil by 634,000 bbl., and heavy fuel oil by 1,835,000 bbl. The total inventories give you the figure I cited a moment ago: 5,705,000 bbl. below the level of last year.

You may recall that, last summer, something was not only said about the probability of such

COMMITTEE RECOMMENDATIONS

Coordinator Ickes in appearing Tuesday before the Cole subcommittee made public the findings of a committee from the Petroleum Industry War Council. This committee was appointed to investigate the petroleum situation in the Atlantic seaboard states. The committee which was headed by W. S. Farish, president of the Standard Oil Co. of New Jersey pending a decision on rationing recommended:

Immediate 7 p.m. to 7 a.m. curfew for all retail stations and all day Sunday with a few necessary exceptions.

Appeal to the public to conserve petroleum products.

Action by Maritime Commission to divert tankers with coils from clean service to fuel oil.

A priorities system for heavy fuel oils.

Government action to convert a substantial number of industrial users from oil to coal.

Prohibition on installation of new industrial oil-burning equipment except for strictly defense work.

Railroads speed up tank-car turnaround.

Tank-car users in Districts 2 and 3 surrender 10 per cent of their cars to the eastern district.

Steps be taken to curtail total East Coast consumption of petroleum products by 15 per cent below current levels until April 1.

a situation, but something was done about it—not *too little, too late*, as so frequently is the case. In fact, some said *too much* was done *too soon, then*—but they may have a different opinion, *now*.

During last summer's period of sales' restrictions and curfews, East Coast stocks of crude oil and the three principal products were built up from a deficit of about 9,000,000 bbl., as compared with the year before, to a surplus of 482,000 bbl. by the time that the restrictions were lifted. That wasn't much of a cushion, but, thanks to the warmest fall in the history of the Weather Bureau, it kept growing until it reached a peak on December 13 of 8,400,000 bbl. surplus. It's all gone, now.

I now want to pass along to you a written statement that has come to me from the heads of the principal oil companies in the eastern area.

Committee's Statement

Here is the report that was presented to me. I quote:

"The following statements of fact and recommendations regarding the East Coast supply situation and the immediate outlook are agreed upon by the representatives of the industry here assembled:

"1. Over-all East Coast inventories of petroleum and its products on January 31, 1942, as afforded by the Bureau of Mines (exclusive of stocks in bond) were 64,550,000 bbl. This represents a decrease of approximately 3,250,000 bbl. from stocks on a comparable basis as of the corresponding date the year before. In terms of days' supply, stocks as of January 31, 1942, represented an estimated 39 days against 43 days as of the same date last year at the rate of consumption then prevailing.

"2. While the over-all industry stocks are comfortable, the diversion and sinking of tankers and delays brought about by war conditions, have resulted in the reduction of East Coast stocks by about 11,500,000 bbl. during the month of January, or at the average rate of approximately 370,000 bbl. per day. This is more than three times the normal rate for this month.

"3. From past history, daily consumption in February and March averages only slightly less than in January. Therefore, unless some steps are taken to bring about a positive curtailment, we should anticipate that the average daily demand until April 1, 1942, will be practically as great as during the month of January when stocks were pulled down at such an alarming rate.

"4. Available tanker transportation decreased substantially during the month of January due to sinkings, diversions and new regulations. Only partially offsetting this are substantially increased use of tank cars, the coming into operation of the Plantation Pipe Line and increased operations of the Southeastern Pipe Line.

"5. So far as the over-all outlook for transportation facilities between now and April 1 is concerned, while the completion of several tankers is hopefully anticipated, it seems only reasonable to assume that these cannot be expected to offset further diversions already in sight and possible additional sinkings.

"6. With necessary reservations as to the uncertainty of weather conditions, the number of additional diversions and sinkings, and in loss in carrying capacity used in the new regulations, it is the opinion of the assembled industry representatives that unless steps are promptly taken to bring about substantial curtailment, the drop in total East Coast stocks will continue at about the same rate during the next 7 weeks as during January, and that this will bring total East Coast stocks substantially below a safe working level.

"7. The industry is using more tank cars to bring crude and products into District 1 than at the peak of the movement last fall, and in addition, has substantially more tank cars on order than it has been able to secure. It is accordingly urged that the railroads be requested to speed up tank-car turn-around, and that tank-car users in Districts 2 and 3 be asked to make available about 10 per cent of their cars to be used in this emergency movement.

"In addition, the assembled industry representatives recommend that steps be taken to curtail the total East Coast consumption of petroleum products to the extent of approximately 15 per cent from current levels during the period February 15 to April 1. It is impossible at this time to predict whether or not curtailment will be necessary beyond that date when total consumption normally falls off substantially. On the other hand, this period of reduced demand should be used to rebuild stocks to more normal levels by next fall."

To them, as to me, it is obvious that normal deliveries can't be expected when you take a large number of tankers from a region which, normally, gets 95 per cent of its oil by ocean shipment. These men—and bear in mind that they are among the leaders of the oil industry in this country—are not pleased with the situation.

They know, as you and I do, that it is useless to quibble over whether the lack is in oil or in the ability to move it. If the time comes when there is not enough oil in the factory or the home, it is small comfort to be assured that there is plenty of it to be had—that it is not obtainable because there is no way to deliver it from the producer to the consumer.

The railroads are doing an excellent job in moving a large volume of oil. Mr. Pelley, president of the Association of American Railroads, is working closely with the Office of the Petroleum Coordinator and I, for one, am very happy about the results that have been achieved. We have urged the oil companies to use tank cars. They are using tank cars, and they will continue to use them to the absolute limit. There is no occasion for argument on this point. We shall continue to press, as we always have, for the use of tank cars to the fullest possible extent. The action of Mr. Leon Henderson, in authorizing a 0.3-cent increase in gasoline prices in the eastern states, to help defray the added cost, has assisted materially.

Tank Cars Alone Not Enough

But you do not need me to tell you that, regardless of how fully or efficiently tank cars and other forms of overland transportation are used, they cannot do all of the job that would normally be done by tankers. Even during our record-breaking week in the East, when 223,000 bbl. of oil daily were brought in by tank cars, this amount was only about 14 per cent of our total demand. Even if the movement is increased to 300,000 bbl. daily it would still represent only a fraction of our needs.

One thing is clear today and that is that whatever we may do to increase overland transportation, we still cannot continue to expect normal supplies of petroleum until our shipping situation improves. Taking this into account, we have undertaken (first), the giving of a precedence to those products most needed; and (second), the equitable distribution of the supplies available.

However, so far as I am concerned, the squabbling of last summer and fall is history. It is the God-given right of the American citizen to belt his public servants with verbal vegetables, so why should I protest this venerable custom?

Seriously, all of us are now very solemnly aware that we are at war. We are interested, not in what happened in September, but in what is happening in February, and what will happen from now on in. That is what I propose to discuss with you gentlemen.

We are now compelled to admit: "Surplus doesn't live here any more." As I mentioned earlier, our deliveries have been falling at a rate of about 300,000 bbl. a day. May I point out that this is less than the planned capacity of the 24-in. crude-oil pipe line from Texas to New York, which the oil companies were ready to build last summer, and which this office strongly supported? May I also point out that later plans provided for additional pumping stations, which would have boosted the capacity to 350,000 bbl. a day? That is equal to the capacity of 70 average tankers operating between the Gulf and the East Coast. When the railroads expand the good job that they are doing now and are moving 300,000 bbl. or more of oil daily to the East Coast, they then will be approaching the capacity of the proposed pipe line. Even then, we shall still be approximately 300,000 bbl. a day short of the amount that should be coming in. In other words, right now we need both the railroad tank-car movement and the pipe line.

Only a Question of Steel

Contrary to the belief in some quarters, the Supply Priorities and Allocations Board did not at any time say that the proposed pipe line was not a desirable project. Its ruling simply was that the steel that would have been required—456,000 tons for a capacity of 350,000 bbl. daily—was needed more acutely for other projects. I did not assume then, and I do not assume now, to pass upon the question whether there is a more imperative need of steel for a pipe line or for other projects. But I believed then, and I believe now, that the line should be built—if the steel can be made available.

As a matter of fact, it should have been built and in operation before a petroleum coordinatorship was set up by the president. More than 20 months ago, after a study by experts of the Department of the Interior, I reported that, while there was adequate transportation of petroleum to the East Coast at that time, there would not be adequate transportation in an emergency.

Hardly a day goes by but that new emphasis is added to the gravity of our shipping situation. Less than 24 hours ago an official announcement was to the effect that an enemy submarine had torpedoed three tankers and then shelled the refinery at Aruba, off the coast of Venezuela—one of the greatest oil centers of the world and a shipping point for United Nations' supplies. A fourth tanker was torpedoed, but not sunk at adjacent Willemstad, likewise an important oil center. The implications of such a bold thrust against our oil-supply lines are indeed ominous.

I believe that the industry very generally now recognizes that the petroleum coordinator has no desire to take over the oil business. At the very outset I announced that it was no concern of mine whether a business was great or small. I have no wish to impinge upon a jurisdiction that is exclusively that of Congress.

In brief, as I see the present situation, we are confronted with a scarcity of heavy fuel oil, the failure of which supply would seriously interrupt extensive manufacturing plants, particularly in New England. We are in the hands of the weather so far as our stocks of light fuel oil are concerned. We may run into a serious shortage there. Therefore, there is justification for suggesting to the Maritime Commission and to the oil industry that some of the tankers now used to carry gasoline to the North Atlantic states be converted to the

(Continued on Page 24)

Injudicious Use of P-98 Brings Implied Warning From OPC

By H. STANLEY NORMAN

WASHINGTON, D. C., Feb. 17.—Some of the most liberal provisions of Preference Rating Order P-98 are being jeopardized by imprudent use. There is a threat, not yet expressed but implied, that the sections affording an opportunity for this imprudent use may be modified or perhaps completely removed unless abuses cease.

These conclusions are based on an investigation of the inner workings of the priority system made here last week. Meanwhile, many of the original causes of delay and confusion have been eliminated as the work of the OPC and WPB are correlated on a more satisfactory basis. This does not mean, of course, that a person can come to Washington in the morning and start home that evening with assurance that the materials he desires will be procurable. However, action with such speed may be possible if the situation constitutes a real emergency.

Evidence of industry abuse of Preference Rating Order P-98 is not conclusive but the circumstances point rather directly to that end. Priority experts in the OPC organization are men with a background in the supply or operating end of the industry and can gage rather accurately the urgency and reasonableness of requests for preference assistance in procuring materials.

Sections of P-98 which may be jeopardized unless used with restraint and entirely in keeping with actual conditions are those extending high-preference ratings for refinery and transportation repair materials, ranging from A-2 upward. Most of the indicated abuses fall under provisions of Section 2 (*i*) through (*v*), inclusive. The full text of the section reads as follows:

2. In addition to the requirements of paragraph (*e*) (1), the operator (but not a supplier), in order to apply the preference ratings assigned by paragraphs (*b*) (1) (*i*), (*b*) (2) (*i*), (*b*) (2) (*ii*), (*b*) (2) (*iii*), and (*b*) (3) (*i*), must communicate with the Office of Petroleum Coordinator, Washington, D. C., Ref. P-98, supplying in detail the following information:

(*i*) Date of actual breakdown or suspension of operations (if applicable); (*ii*) the equipment to be repaired and its operating importance (if applicable); (*iii*) the material and quantity thereof necessary to effectuate the repair or to initiate or maintain operations; (*iv*) the supply of the necessary material which the operator has on hand or available; and (*v*) the names and addresses of suppliers from whom the material is to be obtained and the earliest delivery dates assured by any such supplier for delivery of the minimum necessary quantity of material.

Repair and Maintenance Materials

This means that operators of pipe lines, refineries, or producing tools seeking materials qualifying under the five specific portions of P-98 must continue to deal through the OPC and the WPB. The higher preference ratings provided by the five specific portions of P-98 are designed to give operators a reasonable amount of repair and maintenance materials in advance of actual breakdowns or for types of work that are receiving special encouragement under the program of expanding reserves.

Paragraph (*b*) (1) (*i*), for example, extends a rating of A-1-e to deliveries of material to an operator engaged in production, which is to be used exclusively for operations directly involved in the search for and discovery of a previously unknown pool or part thereof by means of geological, geophysical, or geochemical prospecting.

Paragraph (*b*) (2) (*i*) provides a preference rating of A-1-a to deliveries of material to an operator engaged in refining, which is to be used for the repair of the operator's property or equipment when there has been an actual breakdown or suspension of operations and the essential material for effecting the repair is not otherwise available.

Paragraph (*b*) (2) (*ii*) extends a preference rating of A-1-c to deliveries of that minimum quantity of material, to an operator engaged in refining, which is necessary to make reasonable advance provisions for averting an actual breakdown or suspension of operations.

Paragraph (*b*) (2) (*iii*) extends a preference rating of A-2 to a list of approximately 33 chemicals used in refining operations as solvents and for treating.

Paragraph (*b*) (3) (*i*) extends a preference rating of A-2 to deliveries of material to an operator engaged in transportation, which is to be used for the repair of the operator's property or equipment when there has been an actual breakdown or suspension of operations and the essential material for effecting the repair is not otherwise available.

Out of the five provisions extending high preference ratings that OPC feels are being abused in certain applications for assistance in the procurement of supplies (*b*) (2) (*ii*) is the most troublesome. This paragraph deals with extension of aid in procurement of refinery supplies that are intended for guarding against breakdowns and possible suspension of operations. However, applications under the other specific paragraphs are also stacking up and in some instances there has been either misunderstanding on the part of applicants or they have a misconception of what constitutes an interruption of operations.

Applications Piling Up

The high influx of applications for preferential assistance in procuring supplies has caused an accumulation in the OPC processing work. Applications are pending for certain materials that have been in Washington for a month or longer, chiefly because applicants are seeking supplies as protection against repairs in the indefinite future. In most instances, the materials sought for future repair and maintenance requirements are those for which the greatest shortage exists. Chromium, for example, is extremely difficult to obtain for civilian industry and this alloy is one of the most sought after for refinery-still tubes.

The OPC has deliberately held up certain applications involving the scarcest materials when the operation for which they are intended is not of an emergency character. There is an incentive to space such requirements over a projected period to prevent the total so assigned from looming out of proportion to the general picture. If all requests for assistance in the procurement of chromium for the oil industry were thrown into the machinery of the WPB at one time it would cause a near panic. WPB's function, along with others, is to see that available supplies of scarce materials are spread among the essential industries on as equitable a basis as possible. It is obvious that if the demand for some particularly scarce metal or alloy from one industry becomes disproportionate to the total essential requirements, something would have to yield.

The OPC, accepting the word of men respon-

Steps in Getting Priority Assistance

WASHINGTON, D. C., Feb. 17.—Here is what happens to an application for priority assistance to obtain supplies for the petroleum industry.

1. All applications, regardless of what department of Government they reach originally, receive first official attention at War Production Board's section of operations and control. Here a routing slip is attached and the application stamped with a number. The record, consisting of duplicates of the routing slip, includes date of receipt, name of applicant and name of the supplier from which the material requested is to be obtained.

2. Then it goes to the endproducts branch, which in the case of petroleum equipment, is the OPC. Here it is appraised for completeness, reasonableness, necessity, and other considerations.

3. Next, the application goes to the priorities specialist of the branch which, in case of OPC, is the office of James E. Hughes.

4. Then it goes back to the War Production Board branch controlling distribution of the material covered in the application.

5. Next to the review and approval section of WPB which is the key point in the process.

6. Then the application goes back to the operations and control section where the record of disposition is transferred to the original card.

7. Finally, the transmittal section gets the application for mailing to the applicant.

View showing harbor at Curacao, N.W.I., with refinery of Royal Dutch-Shell subsidiary in background. This refinery and that of Lago Oil & Transport Co., Ltd. (Standard of New Jersey), located on the adjoining Aruba Island, were shelled Monday by enemy submarines which also destroyed oil tankers in that area

This Week...

Steel, not oil, to be measure of value for oil industry, Wirt Franklin, the District 2 OPC director, tells Illinois oil group, warning that the 40-acre spacing rule is here to stay for the duration.

●

Contract awarded for construction of another 100-octane gasoline plant to cost $18,000,000. War Department's desire to plug channels of information dissemination keeps other details undisclosed.

●

Operators warned that imprudent use being made of some of the most liberal provisions of Order P-98 is jeopardizing the retention of these sections in the order.

●

Continued curtailment in coastwise tanker movement brings large decline in East Coast inventories of crude oil and several refined products. The same situation causes excess stocks to accumulate at Gulf Coast points with markets there generally weak.

●

Coordinator Ickes appearing before Cole committee says National Defense pipe line connecting southwestern and middle western crude-oil supplies with Atlantic seaboard refinery should be built.

●

Texas Railroad Commission following hearing at Austin finds substantial reductions in allowables in several areas necessary due to reductions in market outlets, a development of the tanker situation.

●

Tank-car shipments of crude oil and products to Atlantic seaboard points jumped to 225,000 bbl. daily, 50 per cent greater than the peak movement of last fall, in an effort to offset the restricted coastwise-tanker movement from the Gulf Coast.

Japanese invaders take over large part of East Indian oil-producing and refining properties. Fields there normally produce 170,000 bbl. daily with approximately the same refining capacity. Refineries and fields in Sumatra reported destroyed before being taken over by invaders.

●

The Hycar Chemical Co., subsidiary of the Phillips Petroleum Co. and B. F. Goodrich Co. will spend $30,000,000 in building alkylation and butadiene units at Borger, Tex. The construction program includes pipe lines. The plant is designed to furnish large quantities of material used in the manufacture of synthetic rubber.

●

Committee from Petroleum Industry War Council recommends 15 per cent reduction in civilian consumption of petroleum products for eastern part of the United States. Committee warns general rationing of petroleum products may be necessary.

●

All oil-producing and refining areas fronting on the Caribbean Sea brought into war area through submarine attacks on oil-tankers and shelling of refineries in Netherlands West Indies. Oil shipping in this area will be curtailed until extent of enemy operations is determined.

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ible for priority administration, is attempting to procure for the oil industry essential operating supplies, keep the total requirements in line with those of other equally essential industries and at the same time keep the machinery for extending such assistance at an effectively high gear.

Another troublesome provision in P-98 which OPC priority specialists in the material division hope to revise along with other changes now receiving consideration is Paragraph (*c*) (2) which says:

"Any supplier of material to the delivery of which a preference rating has been applied as provided in paragraph (*e*): provided, however, that no supplier may apply a rating to deliveries of material which such supplier will himself process or physically change."

This particular paragraph is particularly troublesome with reference to such materials as tube turns and furnace brackets. Terms of P-98 provide the machinery for the refiner to repair his furnace but prevent the supplier, who in this case makes substantial alterations in raw material to finish the products, from extending the preference number to his source of supply.

Changes in P-98 are under consideration. Two or three times during the past 2 weeks it has appeared that the final draft of changes would be approved and issued. But each time some insurmountable hurdle has been thrown up in the path such changes must travel and a good part of the work has been started afresh. Late last week it again appeared probable that the provision requiring countersignature of purchase orders by district directors of the OPC for most repair and maintenance materials was headed for discard. This same prospect has been revived periodically since the order was first issued, although action appears to be more likely in the near future than at any of the times in the past that the question has seemed near solution. Assignment of E. E. (Ned) Robbins from the District 2 director's office to Tulsa, where he is authorized to countersign Mid-Continent purchase orders has done much, according to the OPC, to quiet complaints. There remain other sections of the country where the inconvenience of taking or sending purchase orders to the OPC district director is almost as great as was the case in the Mid-Continent. Permanent relief may be forthcoming in the near future.

Interpretation of what OPC will consider a uniform-spacing pattern under terms of Conservation Order M-68 has been delayed by many of the same considerations that have deferred changes in P-98. OPC attorneys have difficulty composing differences in language. First the ideas of one lawyer or group prevails, then another has review powers and the procedure frequently results in harmonizing of differences by conferences. Further delays occur in finding a time when it is convenient for all interested parties to meet, nearly always this involves delays of from 48 hours to days or even weeks.

Interpretative Amendments to M-68 Expected This Week

WASHINGTON, D. C., Feb. 17.—An interpretation, or rather two amendments to M-68, are in final stages of preparation and are expected to be officially announced the latter part of this week. The interpretative amendments specify that uniform spacing as used in M-68 means that wells drilled in fields subsequent to issuance of the conservation order may not be nearer than 660 ft. to another producer. Also, the War Production Board will consider that its "uniform-spacing" limitation in M-68 means that wells must be drilled in the same geographical location of adjacent 40-acre units. (See p. 14, The Oil and Gas Journal, Feb. 5.)

WPB EXPLAINS ILLINOIS EXCEPTION TO M-68

WASHINGTON, D. C., Feb. 17.—An exception to Conservation Order M-68 has been granted to a well on a 1-acre tract in Illinois, it was disclosed here today, but it is not a reflection of any change in the general policy of the OPC or the War Production Board. Extenuating circumstances surrounded the case involved. It is claimed. The well is known as Arsht et al 1 Lockwood. It was formerly known as M. Roberts 1 Lockwood. It is located 1,156 ft. from the north line and 66 ft. from the east line of NW¼ 24-6s-5e, Hamilton County, Illinois.

The operator had spudded the well at 2:30 a.m., December 24, just 2½ hours after the effective date of M-68, which has been interpreted to not apply to drilling wells that were actually spudded by December 23.

Furthermore, the operator had drilled 1,500 ft. of hole before he received word of the spacing prohibitions in the conservation order.

The OPC declared today that so far as it is concerned it has established a policy of granting exceptions to M-68 on any well or location which was drilling or on which any substantial amount of work had been completed prior to the effective date of the order.

East Indies Oil Territory Is Largely in Jap Control

REFINERY facilities totaling 61,250 bbl. daily crude capacity and 7,400 bbl. cracking capacity are in territories now occupied by the Japanese, according to press reports the first of the week. This amounts to 31 per cent of the total crude-oil capacity of all refineries in the East Indies and 26 per cent of the cracking capacity. An additional 60 per cent of crude capacity and 72 per cent of cracking capacity is on the island of Sumatra and is either destroyed, under attack or cut off from the remainder of the Netherlands Indies. This leaves only 9 per cent of the crude capacity and a mere 600 bbl. of cracking capacity in Java where it is concentrated around the naval base of Soerabaja, and therefore in the path of any Japanese attempts on Java. Press reports indicate that refineries in Sumatra were destroyed before the invaders took possession.

The first attack of the Japanese was on North Borneo, where nearly 10 per cent of the oil production of the islands was concentrated. The push down the Macassar Straits captured first Tarakan and then Balikpapan, amounting to another 17 per cent of East Indian production. The capture of Amboina cut off the small production of Ceram and this, together with the current advance on Sumatra, endangers 74 per cent of the islands' production, leaving but 9 per cent on the island of Java.

The only sources of supply for the forces operating in this sector of the world's battlefront are America and Iran. Of these the former is cut off by Japanese occupation of the naval bases in the mandated islands between the Philippines and Hawaii. Transportation of oil and products from Iran is made hazardous by Japanese occupation of Singapore, even if they do not succeed in establishing bases in Sumatra. Some Burmese oil might be available but the fields lie directly in the path of the Japanese attack which is attempting to cut off the Burma Road.

Thus, the Japanese have been favored by having practically all of the oil and refineries of the Indies lie along the paths most strategically located for penetration and domination of the islands. The potential bases that might be set up in Australia are shut off from oil supplies by Japanese occupation of the islands, save for the small amount that might be transported around either Cape Horn or the Cape of Good Hope. The East Indian oil situation is summarized in the accompanying table, based on reports up to February 16.

OIL SITUATION IN EAST INDIES

REFINERIES

In Captured Territory

Company, location—	Capacity (bbl. daily) Crude	Cracking
Shell, Balikpapan, Borneo	41,250	7,400
Shell, Lutong, Sarawak	20,000	.....
Total	61,250	7,400
Under Attack or Cut Off		
Shell, Pankalan, Sumatra	23,000	.....
Shell, Palembang, Sumatra	50,000	2,500
Standard-Vacuum, Palembang, Sumatra	45,000	18,000
Total	118,000	20,500
Under Allied Control		
Shell, Wonokromo, Java	2,500	.....
Shell, Tjepoe, Java	15,000	600
Standard-Vacuum, Kapoen, Java	500	.....
Total	18,000	600
Grand total	197,250	27,900

FIELDS

In Captured Territory

Name, location—	No. wells	Daily output
Miri, Sarawak and Brunei	460	17,500
Balikpapan and Tarakan, Borneo	890	32,000
Total	1,350	49,500
Under Attack or Cut Off		
Boeloe, Ceram	50	1,500
Palembang, Sumatra	1,375	91,000
Medan, Sumatra	175	20,000
Total	1,600	112,500
Under Allied Control		
Madura, Rembang, Java	335	17,000
Grand total	3,285	162,000

West Indies Attack Threat to Large Petroleum Operations

TWO of the world's largest refineries and an important shipping section were brought into the war area Monday when plants located on the Aruba and Curacao islands of the Netherlands West Indies were shelled by German submarines. The plant on Aruba Island belongs to the Lago Oil & Transport Co., Ltd. (Standard of New Jersey) and has a capacity of 285,000 bbl. daily. The Curacao refinery belongs to Curacaosche Petroleum Industrie Mij. (Royal Dutch-Shell) and it has a rated crude-oil capacity of 185,000 bbl. daily.

Both plants obtain practically all of their crude-oil supplies from the fields of nearby Venezuela. Reports Tuesday stated seven tankers which transport crude from Venezuela to the plants were either destroyed or badly damaged. A large fleet of shallow-draft tankers are operated between the fields of the Lake Maracaibo area and the two refineries. Some crude oil produced in eastern Venezuela and in Colombia is also transported to the two refineries, which normally are the largest source of supply for Great Britain and several countries in South America.

It is expected that the raids on shipping and the attacks on the refineries which did no damage at the plants will curtail shipping for a time. This curtailment will include the export movement from Colombia amounting to approximately 50,000 bbl. daily and shipments of refinery products from Trinidad of the British West Indies. Trinidad's crude-oil production at this time is approximately 55,000 bbl. daily. Press reports also indicate that oil shipments from the West Coast through the Panama Canal would be stopped for a time. Imports to the United States from South American countries and the Netherlands West Indies recently have aggregated about 150,000 bbl. daily.

Oil-Field-Equipment Men Discuss Industry's Price Structure

Nearly 500 oil field equipment and machinery men from all sections of the United States crowded a meeting in Dallas, Tex., February 11, to discuss with officials of the Office of Price Administration from Washington the price structure of their industry.

As explained to them at the outset by Carrol L. Christenson, assistant administrator of the machinery division of OPA, the Dallas meeting was called as an "exploratory" executive session, to get the direct views of men engaged in this industry, as Congress instructed in the recent Price Control Act, before setting price schedules affecting that industry.

Mr. Christenson, in an introductory talk, explained the new price control legislation, and distributed among the oil machinery and equipment men copies of a tentative draft of the proposed schedule effecting their business. He invited their suggestions, criticism and questions regarding the entire program.

Assisting Mr. Christenson were U. R. Laves, of Washington, chief of the oil-field-equipment unit of OPAs machinery section; L. Petschaft, Washington, member of the OPA legal staff and Edgar Higgins, field liaison officer of the machinery section; J. A. Harris, who came with them from Washington to assume the post of field representative in the Dallas regional office of OPA. The regional staff of OPA, including Max L. McCullough of Dallas, regional director, and William H. Brooks, region executive officer, also participated

Christenson Issues Statement

At the conclusion of the closed general session, Mr. Christenson issued a statement pointing out that "production of equipment for the oil industry is vital to the victory program.

"Further explorations and drilling must be effected and production must be maintained in proven fields," he said. "Without the wholehearted support of the oil industry, the fuel necessary for ships, planes and tanks would not be available."

After noon-hour study of the tentative price schedule submitted at the morning session, the oil-machinery and equipment men submitted questions at the afternoon session to Mr. Christenson and Mr. Petschaft for answers regarding certain points of the program and interpretations of the price control law.

After the general session adjourned, a smaller group meeting was held for dealers in used equipment.

A smaller group, representing different sections of the industry, met with Mr. Christenson and his associates to go over specific points in the proposed price schedule.

Among those participating in this smaller group meeting were Gordon Richmond, Houston, Tex.; W. M. Bovaird, Tulsa; E. L. Decker, Long Beach, Calif.; Frank Champion, Los Angeles, Calif.; Lawrence Baash, Los Angeles; Earl Miller, Oklahoma City, Okla.; H. W. Cardwell, Wichita, Kans.; A. W. McKinney, Toledo, Ohio; Fred Spang, Pittsburgh, Pa.; Thomas Northrup, Parkersburg, W. Va.; W. D. Wilson, Houston; W. L. Childs, Houston; Tom Hunt, Houston; Frank Hinderliter, Tulsa; Walter Trout, Lufkin, Tex.; Jay Walker, Tulsa; M. E. Montrose, Los Angeles; E. Lorehn, Houston; M. O. Johnston, Los Angeles; George O'Leary, Houston; and Frank Brinegar, Dallas.

Contract Let for 100-Octane Plant; Others Are Pending

By H. STANLEY NORMAN

WASHINGTON, D. C., Feb. 16.—Contract for another 100-octane gasoline installation, one of the largest yet attempted in the war-expansion program, was negotiated here last week. The plant will cost approximately $18,000,000 but no other details were disclosed, giving another concise affirmation of the War Department's determination to plug all possible channels of information dissemination when a war plant is involved.

It was impossible to learn more details on the plant, its location, capacity, the process to be employed and other similar data that have been more or less accessible in the past.

War and Navy departments have been insisting for weeks that other departments and agencies of the Government that handle phases of war-plant contracts should retain all information that might aid the enemy.

In the case of the new 100-octane gasoline unit, it was understood that the completed project will be capable of producing about 5,000 to 8,000 bbl. of finished aviation fuel daily. It will be in the southern part of the country but for the present, at least, a more specific identification is impossible.

There are scores of other projects pending in Washington, all related to the production, storage or transportation of 100-octane gasoline, its components or those of synthetic rubber. It is hardly more than a good guess but 100-octane plants built or started before Pearl Harbor along with those contracted since by the Government have a calculated capacity of 100,000 bbl. daily. This means that about 80,000 bbl. of additional capacity must be provided promptly to assure fulfillment of the Government's temporary goal of 180,000 bbl. daily. Future developments will determine whether the tentative goal is sufficient to meet requirements of the United Nations. Much will depend on how rapidly the aircraft and automobile industries can produce the 186,000 planes called for by the end of 1943.

Civilian Restrictions Pending

Meanwhile, other forms of restraint on civilian consumption of petroleum are beginning to appear. Scheduled for issuance in the near future is an OPC allocation of tetraethyl lead, removing the control of distribution of this material from the hands of private industry. The allocations of lead will be fairly general, it is understood. OPC, probably working through the War Production Board as it is forced to do on all matters of restricting supplies, will merely recommend what percentages of the total supply should be made available to each class of consumer. The plan, which is still somewhat nebulous, would provide for a certain percentage of lead for use in 100-octane gasoline for the armed services, another amount of lend-lease diversion to Allied Nations, another percentage to go into storage and a fourth figure for civilian consumption.

There were some hints that the probable change in the control of tetraethyl lead supplies is not because of any breakdown in the system that has been in operation for several months. Rather the change appears to be a coordinating effort that may have a tendency to eliminate possible disgruntlement or friction between individual consumers. Apportionment of lead supplies among the individual refiners out of the total assigned for whatever types of products they are producing will continue to rest within private industry.

It is growing more apparent with the passage of time that rubber rationing is here for the duration. Leon Henderson, director of the Office of Price Administration and of the Office of Civilian Supply, indicated this conclusion rather definitely during a press conference here last Friday. He denied having word that much of the rubber stores in the Netherlands East Indies was en route to this country.

The director of OPA said that our biggest reserves of rubber are in the 1,500,000,000 tires now in service on the nation's automobiles. He added that information from tire companies, dealers and rationing boards, which now total 9,000 throughout the country, confirmed earlier indications that practically all cars in the nation can be continued in service indefinitely by prudent use.

A plan to siphon off about 11 to 15 billion dollars of the national income by enforced savings or some other form that would defer release of this amount of money to the consumer was urged by Mr. Henderson. He suggested higher corporate taxes, higher individual income taxes and enforced savings plans as being among the things that would accomplish the purpose. He feels that there will be approximately that volume of income available to the buying public this year at a time when there will be a shortage of consumer goods. His theory is to withhold the surplus funds from the buyers in order to prevent an inflationary pressure of idle money on the price of available commodities.

Detailed instructions have been issued by the OPA outlining machinery established by that office for the filing of protests against price orders along with an explanation of basic provisions of the Emergency Price Control Act of 1942. Price schedules issued by the OPA since its creation on April 11, 1941, will remain in effect, Mr. Henderson has announced, and he pointed out that business men are equally liable for violations under those rules existing prior to the passage of the Emergency Price Control Act.

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Committee Formed to Direct Oil-Economy Drive in East

By J. P. O'DONNELL

NEW YORK, Feb. 17.—A committee on supplies and distribution, composed of 16 eastern oil men, has been formed in an endeavor to adjust supplies in order to avoid, if possible, any necessity for rationing oil products on the East Coast as a result of the interruption of coastwise tanker service. Formation of the committee has been approved by both the Office of Petroleum Coordinator and the Department of Justice. Its recommendations are to be passed on by the OPC and early approval is anticipated.

The first task of the committee is preparing the recommendations "for more cautious use and greater fluidity in handling of stocks already moved to the East Coast" which has been necessitated by the "rapid depletion of East Coast reserves." Lines which conservation methods are expected to follow are:

1. Closing of service stations daily from 7 p.m. to 7 a.m. and a full 24-hour closing on Sundays.

2. Restriction of deliveries of heating oil to homes in the hope of saving an average of 50 gal. per consumer. Such a plan, if successful, would save approximately 70,000,000 gal. since there are 1,375,000 domestic burners in use in this area.

3. An educational campaign showing the savings possible by maintaining residential daytime temperatures of 68° and nighttime temperatures of 58° since a 1° reduction will effect a saving of approximately 3 per cent.

4. Urging industrial consumers of residual fuel oil to convert their burning equipment to coal wherever possible.

5. Keeping accurate record of the location of all bulk supplies for pooling and redistribution if necessary.

Members of Committee

Members of the committe are: S. B. Eckert, Sun Oil Co., Philadelphia, chairman; R. T. Haslam, Standard Oil Co. of New Jersey, New York; W. L. Faust, Socony-Vacuum Oil Co., Inc.; R. M. Parker, Jr., Hartol Products Corp., New York; W. W. Lowe, Cities Service Oil Co., New York; R. R. Griffin, Shell Oil Co., Inc., New York; Wiley Moore, Wofford Oil Co., Atlanta; W. G. Violette, Standard Oil Co. of Kentucky; J. W. Scott, Buckley & Scott Utilities, Watertown, Mass.; A. E. Watts, Sinclair Refining Co., New York; H. G. Schad, Atlantic Refining Co., Philadelphia; W. A. Slater, Gulf Refining Co., Pittsburgh; O. D. Robinson, Republic Oil Co., Pittsburgh; Jacob Blaustein, American Oil Co., Baltimore; B. I. Graves, Tide Water Associated Oil Co., New York, and W. H. Kershaw, Texas Co., New York.

The first five listed members of the committee also compose the executive committee of which Mr. Eckert is chairman. W. L. Kallman, Texas Co., is executive secretary.

COMPLETE TEXT OF PROCEDURAL REGULATION

The complete text of OPA's Procedural Regulation 1 for the issuance, protest and amendment of maximum price regulations to Price Schedule 88 will be found on Page 84 of this issue. Amendment 1 to Price Schedule 88 will be found on the same page. The February 12 issue of The Oil and Gas Journal starting on Page 26 contained the complete text of Price Schedule 88 and Amendment 2.

STATE CAPITALS...

TEXAS

JERRY SADLER, member of the Texas Railroad Commission, proposed at the state-wide proration hearing in Austin February 16 that ratable taking of oil should be undertaken as the means of establishing harmony among all elements of the oil industry. He pointed to several evidences of discord in the industry which he listed as (1) attempts to annihilate 85 per cent of the independent operators by persons blocking clarification of the federal order limiting drilling to one well to 40 acres, (2) Washington hotels crowded by other persons trying to crucify Harold Ickes, federal petroleum coordinator, (3) objections by some sources in Washington to Texas receiving the major part of the nation-wide production increase certified for February.

The hearing was held to consider testimony on which to base a state-wide production order for March. Nominations of purchasers for crude needed during March totaled 1,845,171 bbl. daily, a decrease of 122,838 bbl. from February nominations. Rex G. Baker, attorney representing Humble Oil & Refining Co., informed the commission that storage capacity of this company in Southwest Texas for high-octane, low-gravity crude would be filled by March 10, necessitating reduced nominations.

Bottom-hole pressures in the East Texas field declined 15.85 lb. during January to 1,000.73 lb. on February 1, Railroad Commission engineers reported.

Mr. Sadler left Austin Monday night for Washington to make recommendations "based solely on the object of winning the war."

OKLAHOMA

FORMALLY PROTESTING the new formula established by the Office of Petroleum Coordinator for allocation of crude-oil allowables of the various states on the basis of reserves, the Corporation Commission of Oklahoma has requested Harold L. Ickes, federal petroleum coordinator, for a hearing to discuss Oklahoma's oil problems.

The commission is basing its protest on contentions that the new method of allocation (*a*) will not promote conservation, but may create waste; (*b*) will not further the war effort, but may retard it; and (*c*) will cause economic and governmental maladjustments in the several states which will have their allowables reduced.

"The proposed formula," the commission's protest stated, "constitutes a substantial departure from the Bureau of Mines market-demand method which has been followed through the years, and which can be described as an established practice. The plan, over a comparatively short period of time, will permanently drive market demand from the states where it presently exists to other states. When that occurs, the market-demand factor outlined in the proposed formula will become a mere abstraction, because market demand will in fact have been determined by the ratio of allowables to reserves."

The protest claimed that the proposed formula will result in "additional drains upon our already inadequate supplies of materials for the reason that refineries and pipe lines must be abandoned and reconstructed and relaid. Fixed and settled operating and producing practices of the industry, which have evolved under a system of free economy, will go into discard. Employment and economic dislocation will afflict the states where allowables are taken away, and entirely new sources of revenue must be found."

Referring to conservation in Oklahoma, the commission in its protest stated that "if and when the time comes we cannot produce our market demand without resultant waste, then we can cut back the production of individual wells and pools to the extent that may be necessary to prevent waste."

ILLINOIS

BIDS ON OIL LEASE and drilling rights in the state game farm in Jefferson County will be opened at noon March 4 by the Illinois Petroleum Lease Commission. They will be received by state Finance Director George B. McKibbin, chairman of the commission. Rules and regulations for competing firms have been mailed by the commission. The new state-government agency was created at the last regular session of the legislature to administer opening of state-owned land for oil prospecting, leasing and drilling purposes.

Operators also will receive newly devised rules and regulations of the state Division of Oil and Gas Conservation by February 21, Samuel F. Peterson, chief petroleum engineer, announced. The new rules have been devised to clarify confusion among operators in the Illinois basin following OPC orders.

INDIANA

REDUCTION of 2,000 bbl. in Indiana's daily production during February to meet the recommendations of the Office of Petroleum Coordinator is predicted by Hugh A. Barnhart, director of the Department of Conservation. The Division of Geology has estimated present production at 19,000 bbl. daily as against the 17,300 bbl. recommended by the petroleum coordinator. A committee of oil producers is attempting to work out control regulations for curtailing the production. Mr. Barnhart said that the state now has approximately 1,800 producing oil wells, of which approximately two-thirds are producing not more than 5 bbl. each daily and approximately 12 wells producing 100 bbl. or more daily. It has been recommended that control be based upon wells and pools.

CALIFORNIA

CALIFORNIA DURING THE FIRST 13 days of February produced approximately 54,000 bbl. daily more than during the same time in January. It may be another several days before California producers receive their February daily quotas so that the state may go over the 633,000-bbl. daily allotment. It is not possible in all cases to shut-in production entirely for a full week at the end of each month to reduce crude-oil production to the specified allotment.

March estimates should be coming out shortly and so far the February allotments have not been broken down by wells and pools. The production committee for District 5, of which E. E. Pyles is chairman, has been working night and day to break down California production in such a way that it will conform with ideas of the coordinator. The local situation is complicated by disrupted tanker schedules and overloaded pipeline facilities, as some fields that should be shut in are in a better position to produce than others which are wanted to produce in line with requirements but which are tied up because of inadequate transportation facilities.

LOUISIANA

THE MINERALS DIVISION of the Department of Conservation has ordered 80-acre spacing for wells to be drilled in the recently opened 5,150-5,450- ft. Pettit zone of the Haynesville field, Claiborne Parish, North Louisiana. The order, signed by J. L. McHugh, conservation commissioner, stated the spacing was adopted to conform with the Government's request to save materials.

Authorization has been granted by the Department of Conservation for dual completion of wells in the Haas and Wilcox sands in the Ville Platte field, Evangeline Parish, Gulf Coast district.

■

Phillips to Spend $30,000,000 for New Units at Borger Refinery

Expanding its Borger, Tex., manufacturing operations to include a unit for the synthesis of rubber substitutes, Phillips Petroleum Co. and its subsidiary, the Hycar Chemical Co., are preparing to spend more than $30,000,000 for two hydrofluoric acid alkylation units, a butadiene unit, gathering lines and product lines. This program will be under the supervision of the natural-gasoline and engineering departments of the company who will cooperate with federal engineers.

All materials needed for construction will be given a high preference rating in keeping with the fact that the new units will manufacture 100-octane gasoline and butadiene, a constituent of synthetic rubber, both highly important in the country's war program. The importance of the program is also shown by the advance of this sum of money by the Government.

Four Priority Clinics Scheduled

WASHINGTON, D. C., Feb. 17.—Four priority clinics, similar to those held a month ago in Tulsa, Tucson, Ariz., and Los Angeles, Calif., have been arranged for Texas, Louisiana, Missouri and Chicago.

The Texas meeting called in Houston February 19 will hear James E. Hughes, WPB's priority specialist attached to the OPC office as the chief petroleum spokesman.

A similar meeting will be held February 20 at New Orleans, La., another is set for February 28 at St. Louis, Mo., and at Chicago, Ill., March 1. Mr. Hughes will not attend the New Orleans meeting for he will be engaged in a business conference at Kilgore, Tex., on that day. It is likely that Elmer E. Batzell, a member of J. Howard Marshall's OPC Legal Division, will handle the petroleum industry end of the New Orleans meeting.

The OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

Published weekly by The Petroleum Publishing Company at Tulsa, Oklahoma

Evaluating Reserves

The Journal's estimates of proven oil reserves at the start of the year as published in its Annual Number of January 29, have been widely quoted and used.

They were released following OPC's announcement of February allocations of crude-oil production which brought decreases in output for several states and increases in others. Official explanations at Washington revealed that changes in state recommendations were based largely on the comparative position of the oil states in known petroleum reserves. Many areas see further substantial reductions in their output if this plan of balancing allowables against reserves continues.

This publication's editors became interested in reserve figures several years ago when it was realized that changes in operating practices had made them the industry's most vital statistics. The application of conservation and proration principles in the production of crude oil ended wide-open field development and resulted in a situation in which the measure of the industry's well-being is the quantity of known oil in producing horizons which can be brought to the surface as needed.

In making estimates we have had the aid of many of the industry's leading engineers and geologists. Certain rules of procedure were established and have been followed. It has been policy from the start not only to publish total figures but also the details from which the totals were derived. Every new pool and every new extension in existing fields have been evaluated.

Realizing there can be differences of opinions in estimating recoverable oil, criticism of our methods and conclusions was sought and that invitation still holds. If there is any question as to the accuracy of the reserve information now available, then no time should be lost in bringing together the best operating talent to conduct investigations as to the industry's present backlog of oil.

With the fortunes of war bringing changes in ownership and destruction to important foreign oil properties, nothing could be more important to the United Nations than an accurate appraisal of known oil reserves in this country. The survey, if made, should include the exploratory practices that were necessary to find the oil and what will be required in equipment, personnel and capital to produce it. The investigation should reveal what has to be done in the future to maintain an adequate reserve.

It must be kept in mind at all times that the present 20-billion-barrel reserve is a working inventory based on market conditions as they have prevailed over the past few years. Higher prices for crude oil will add to the supply in known horizons which cannot be produced profitably at present prices. Lower prices mean an immediate contraction in available underground supplies.

The Oklahoma Corporation Commission and hundreds of producers are correct in many of their contentions relative to the interpretation of the operating significance of these reserves. The Oklahoma Commission placed its finger on one important fact in its protest to Coordinator Ickes pointing out: "The amount of reserves is one thing. The rate at which they can be produced without waste is an entirely different question. Pools and wells possess their own varying characteristics."

Nothing will be gained and much be lost in dislocating the industry operations from the well to the filling station through arbitrary changes in crude-oil output based solely on reserves. This is particularly important at this time when the industry is being called upon to maintain and expand its production with the minimum expenditure of materials and manpower.

The war situation, the economic disturbance in oil areas, conservation principles affecting all branches of the industry, and civilian demands should be placed alongside the current reserve figures in determining production allowables for March and the remainder of 1942.

VIEWS for VICTORY

Modification Is Necessary In Tire-Ration Regulations

By HOWARD A. COWDEN

President, Consumers Cooperative Association

CONSUMERS COOPERATIVE ASSOCIATION, owned nearly altogether by farm people, is deeply concerned with obvious injustices to farmers in the tire and tube-rationing program. In trailers pulled by family cars, farmers bring millions of tons of farm products to market every year and return vast quantities of production supplies to the farm. Yet they are denied tires and tubes for the family car and trailers, and such vehicles are not included among registered "commercial trucks" in determining tire and tube quotas by counties. This will prove to be a serious blow to farmers because thousands of them are using tires now that need immediate replacement if they are to carry on the "food for freedom" program.

Whether or not tank-wagon men can get new tires for delivering refined fuels direct to consumers needs to be decided soon. ICC and state regulations, which at present impose high fees and tolls on truckers who haul for others, are preventing neighborhood arrangements for transportation. It will mean the use of more rather than less rubber unless such restrictions are lifted. These and other problems suggest the need of immediate modification of tire regulations in the national interest.

Practical Ideas Must Apply To Oil Industry's Problems

By D. W. HOVEY

President, Gulf Coast Refiners Association

BOTH the Government and the oil industry have a common cause in seeing to it that the oil industry continues to function with maximum efficiency under wartime conditions. A primary need is the application of practical ideas to the practical problems of oil production, refining and transportation.

The Government has a well-defined duty to determine requirements of the oil industry and to then furnish any assistance which may be required. Stepping up of production is, of course, required and to secure maximum efficiency, customary practices should be used and every effort should be made to avoid deviating from normal and to maintain competitive conditions.

Products not normally produced by the oil industry are being required and equipment to produce such products is being provided by the industry and in many cases Government financed.

Many recommendations and theories will undoubtedly be advanced as to regulation of operations and prices, which may or may not be necessary. I trust due consideration to the practical effects will be given before adoption.

Through the organization now set up under the petroleum coordinator there is every indication of complete cooperation, which should produce a proved record of accomplishments.

War Industry to Place Burden on Conservation

By J. C. HUNTER

President, Mid-Continent Oil and Gas Association

MEETING the nation's needs for oil in 1942, under a program of good conservation practices, will undoubtedly be given a prominent place in the plans and activities of industry and governmental agencies. Many factors arising out of the war emergency will make this task many times harder and more complicated than in normal peacetime operations.

Further development of existing reserves will not be possible in the manner heretofore followed by the industry on account of the shortage of necessary material and the very rigid restrictions placed on the use thereof by the federal Government in the interest of national defense. Dislocation of normal drilling and development operations will undoubtedly cause many headaches. The situation will call for the exercise of patience and a high degree of cooperative effort by industry and all agencies and representatives of national and state government.

Such an attitude on the part of all concerned should assure solution of the matter in an effective and democratic way consistent with wartime needs and with the least disturbance possible under the circumstances.

The prime objective of 1942 will be to discover and produce the greatest possible amount of oil with the use of the least amount of steel and other scarce material. We must have accelerated wildcatting to develop additional reserves to assure ability of the industry to meet current and future needs at a production rate that will safeguard our conservation program and prevent underground waste.

Predictions Hard to Make For Oil-Refining Industry

By C. L. HENDERSON

President, Western Petroleum Refiners Association

PREDICTIONS for the petroleum-refining industry are going to be difficult to make because abnormal demands for war needs for certain products will cause large stocks of other products to accumulate with no immediate market, and consequently causing an unbalanced economic operation. However, since providing the necessary implements of war is the cause of such a situation, each refiner will have to study his operations in order to fit into the pattern on a month-to-month basis.

With the apparent shortages in rubber, lead and certain chemicals, chemists and technologists will devote their efforts to providing means to make synthetic products from petroleum. Each refiner should study his plant and plan, if possible, to produce certain stocks which are necessary to make high-octane gasoline and synthetic rubber.

This war may be longer than anticipated, and everyone should be prepared to make sacrifices and may expect drastic disruptions in their normal operations in all the branches of the industry. As time goes on, substantial curtailment will be made in commodities and materials for civilian use. The first consideration is to produce materials needed by the armed forces of the nation, and by industries building war materials. This demand is now paramount. Meeting it will be the primary objective of the refining branch of the petroleum industry.

Oil Industry Must Develop More Underground Reserves

By T. H. BARTON

President, Lion Oil Refining Co.

IN order to cope with the exigencies of a wartime economy, it is necessary for the industry to develop additional underground reserves. This is imperative, not only to provide fully for our military needs, and to build a backlog for future years, but also to prevent depletion of present reserves and thus nullify our conservation program. It is essential that the crude-price structure be properly adjusted to compensate for the added costs of exploratory and development work.

Refining facilities will be readied to satisfy military demands for high-octane aviation gasoline, toluene, and other essental products. The refining industry's ability to adjust itself to abnormal demand, as witnessed during the first World War, is much more pronounced today, to the advantage of the military effort.

Research activities in all probability will come in for greater emphasis. The first to feel wartime economy, the marketing division of the industry with its extensive distribution system stands ready to cooperate to the fullest, and is ably doing so.

On a war footing, the industry's operations will necessarily be speeded up greatly. This will mean greater effort in every division all down the line, with the nation's military requirements naturally having first call.

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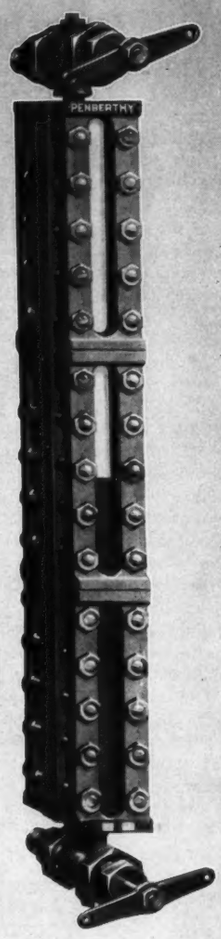

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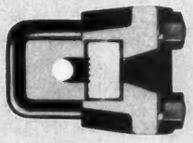

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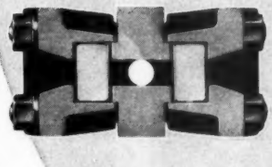

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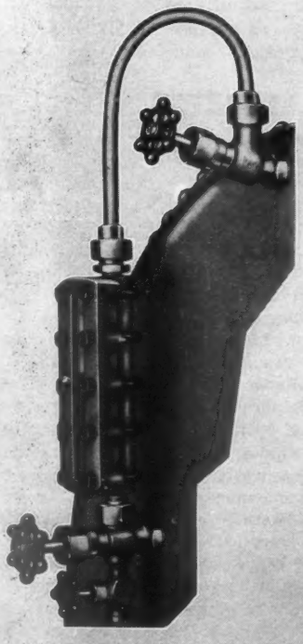

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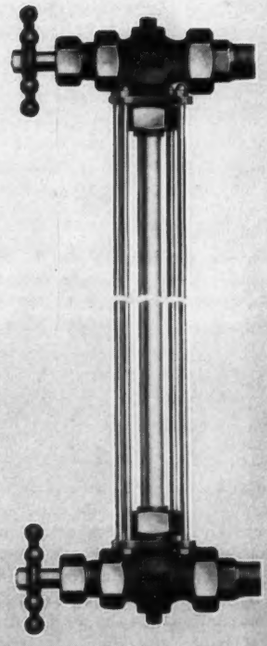

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PENBERTHY PRODUCTS

Order Prohibits Tin-Can Packages

WASHINGTON, D. C., Feb. 16.—Use of tin cans for packaging petroleum products is completely prohibited, except for a few specialty items, after March 1, 1942, under the terms of Conservation Order M-81 issued last week by the War Production Board.

The purpose of the order is to save tin, and applies to containers of any kind made with any tinplate or terneplate. There is no restriction at present on the use of black iron cans or cans coated with other materials than tin. For the remainder of February, cans may be used for packing petroleum products but only to the extent of 50 per cent of each packager's volume during February 1941.

Petroleum products are included with a large group of other commodities which can be marketed in containers other than tin cans, including tobacco, beer, dog food, cereals, spices, and foods like beans which can be marketed uncooked. No tinplate nor terneplate cans may be used for packing these or other commodities not specifically listed in the order.

A few exceptions are permitted to the general prohibition. Tinplate or terneplate cans may be used to package products where so required by the terms of defense orders bearing preference ratings higher than A-2. Special permission may be obtained from the War Production Board to obtain delivery from can manufacturers or to use out of inventory containers which are already made up and where it can be shown that use of such containers for any other purpose would be unduly or unnecessarily wasteful or wholly impracticable. Except for these provisions, the order requires can manufacturers to cancel all orders for "nonessential" containers, and forbids packagers to fill containers already in inventory.

Special products cans are permitted to be used under definite restrictions. This list specifies whether tinplate or terneplate may be used and restricts the use to 100 per cent of the tinplate or terneplate used for that purpose during the corresponding month of 1941, unless a different percentage is specified. Included in this list are:

Fly spray—bodies, terneplate.

Fly spray with pyrethrum and rotenone base—bodies, tinplate.

Dry cleaners—only in 1-qt., 1-gal., or larger sizes, bodies, terneplate.

Graphite—terneplate only where water is present.

Mineral oil for medicinal use—only in 1-gal. or larger sizes, tinplate throughout.

Polish—terneplate throughout; only 50 per cent of 1940 pack.

Waxes—paste, bodies terneplate; only 25 per cent of 1940 pack. Emulsions—terneplate throughout, only 25 per cent of 1940 pack.

Paint thinners—only in 1-qt., 1-gal. or larger sizes, terneplate throughout; in cans of less than 1-gal. capacity, only 50 per cent of 1940 pack.

In this list, blackplate or other material must be used for those parts of the can where tinplate or terneplate is not specified.

Rationing May Be Necessary, Ickes Warns at Hearing

(Continued from Page 15)

transportation of fuel oils of the two grades mentioned. Steps to this end have already been taken. We also see the possibility, as we look into the future, and consider the difficulty in keeping up our petroleum supplies along the eastern seaboard, of insisting that every manufacturing plant that now burns heavy fuel oil which can convert to the use of coal, do so at the earliest moment, provided, of course, that these plants are so located that coal can be supplied to them. Orders to this effect are now being drafted.

The report from the oil industry on the East Coast situation which I have already reviewed with you, calls for a curtailment of 15 per cent in the consumption of petroleum products, until April 1 at least. It urges as the principal measure to be taken that the motoring public be asked voluntarily to curtail consumption and conserve supplies.

This proposal I heartily endorse and the Office of Petroleum Coordinator will support the industry's campaign to that end and otherwise assist in every possible way. However, our experience last year along exactly these lines might well cause us to be dubious as to the effectiveness of such a course now. But today we are at war, and I cannot help but believe that the American public will voluntarily contribute when the need is made known to them. I have faith that our people, realizing the urgent need for cooperation and sacrifice in this direction, will as a matter of patriotic duty, do their part.

Of course, if the need for curtailment should extend to larger proportions, an equitable distribution could only be had through the systematic rationing to the consumer by coupon or other means, but the comparatively mild restriction which is suggested ought to be possible of accomplishment on a voluntary basis. I have discussed with Leon Henderson, the administrator of civilian supply, the question of a rationing system, should it become absolutely necessary that one be installed, and the staffs of our respective offices have already done much work in the perfection of a plan.

However, the rationing of anything runs against the grain with me. I have the greatest distaste for visiting anything of the kind upon the American public, and will come to it only as a last resort. Your committee, I am sure, can be of great assistance in encouraging voluntary curtailment through helping to get the facts before the public in just such a manner as you are doing here today.

As to the petroleum industry's recommendation for the closing of service stations at 7 p.m. and on Sundays, these possibilities are now under active consideration by my office, and when certain further facts, aimed at enabling us to appraise the value of this proposal, are obtained, we shall make final determination. Understand that the Sunday closing referred to would mean a closing of stations on Sunday, not the denial of the motorist's privilege of using his car on that day. I should greatly dislike seeing any restrictions laid down which would prevent the individual from using his car on any day of the week he desired. Sunday driving is sometimes more essential than Monday driving. But of course the closing of stations on Sunday would operate to discourage long-distance motoring and would give the service-station operator 1 day in 7 to rest.

As a step toward protecting East Coast supplies, I propose to ask the War Production Board to reconsider our application for priorities for the necessary steel and equipment for a 24-in. pipe-line from Texas to New York.

OPA Calls Meeting of Equipment Men at St. Louis, February 19

WASHINGTON, D. C., Feb. 17.—The Office of Price Administration has sent out telegrams calling a meeting for Thursday, February 18, in St. Louis, Mo., of a committee of oil-field equipment and machinery men. This committee of approximately 20 manufacturers and supply-company representatives was appointed in Dallas, Tex., February 11, at a group meeting of oil-field equipment men.

C. L. Christenson, assistant administrator of the Machinery Division of the OPA, will have charge of the St. Louis meeting. Its purpose will be to draft a proposed schedule for oil-field equipment prices.

DEATHS

O. E. DUSTMAN, 56, Southern California manager of Ralph N. Brodie Co., with offices in Los Angeles, died February 3 of a heart attack. He is survived by his widow and two daughters.

T. J. CONNOR, 48, vice president in charge of production and a member of the board of directors of Caterpillar Tractor Co., Peoria, Ill., died suddenly of a heart attack, on January 23. Mr. Connor was also administrative head of engineering, purchasing, industrial relations and training and public relations departments. He had been vice president since 1930. His widow and a son survive.

HENRY C. BREEDEN, 72, head of Standard Oil Co. of California before its dissolution in 1919, died February 6 of a heart attack in his suite in a New York City hotel. His widow and a son survive.

H. C. GRIFFITH, 41, district branch manager of the Foxboro Co., Houston, Tex., died suddenly at his home in Houston February 7. He had been associated with Foxboro since 1930.

W. H. CUNNINGHAM, 70, formerly identified with oil-field contracting, died at his home in Tulsa last week. He retired 2 years ago. Four sons survive.

THE MARKETS*

CRUDE OIL: Continued backing up of excess supplies at numerous points in Texas and Louisiana, particularly in the Gulf Coast area, reported. Increasing tank-car movements to East Coast refineries may offer some relief.

REFINERY PRODUCTS: Outlook generally unfavorable for early improvement in situation. Shortage of supplies on East Coast and prospects of rationing foretend greatly reduced over-all consumption. Inability to move products from Gulf Coast continues to augment already depressing stocks. Some stiffening noted in Mid-Continent due to inquiries by majors for material that can be moved by tank car to East Coast but market on whole quiet. Natural gasolines in southwestern and middle western states move toward new lows as demand becomes stagnant.

TANK-WAGON AND POSTED DEALER: Prospects of greatly reduced consumer consumption as result of tire and car rationing dominates situation. Shortage of supplies on East Coast sustains price schedules in those areas. Schedules elsewhere still unaffected by weaker refined markets.

FINANCIAL: Oil securities slipped slightly during the week. Average of 30 representative stocks for the week ended February 14: High, 23.37; low, 22.53; close, 22.81. Week ended February 7: High, 23.90; low, 23.25; close, 23.47.

*Detailed information in market section.

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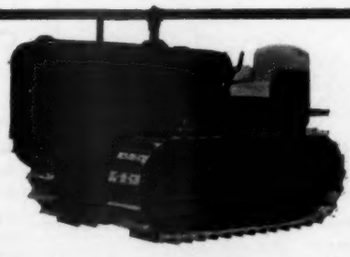

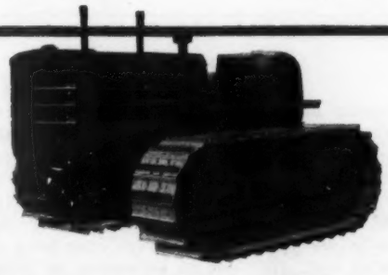

Left: The veteran International TD-40 Diesel TracTractor. *Right:* The new, powerful International TD-18 Diesel TracTracTor.

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Effect of Economic Influences On the Price of Petroleum

By J. H. STRUTH*
Economist, Texas Mid-Continent Oil and Gas Association

IT is significant to consider the fact that over the past 23 years of the 26-year period covered by this paper, the petroleum industry's exploratory activities have been pursued under the congressionally approved depletion provisions of the federal income-tax laws. If oil producers had not been able through depletion to recover the tremendous capital expenditures involved in exploratory effort over this 23-year period, and if the price of crude oil had been the only incentive for such effort, it is extremely doubtful if the recorded achievements of the oil industry could have been realized.

Between 1926 and 1930, when accumulated new discoveries exceeded 14 billion barrels, the quantity of new reserves found per dry hole drilled was 385,000 bbl. The peak year of that period was 1930, with an average of 832,000 bbl. of new reserves found for each dry hole drilled. Between 1936 and 1940 the average number of barrels of new oil discovered per dry hole drilled was only 189,000 and last year the rate per dry hole was approximately 102,000 bbl.

These data indicate the fact that new oil reserves are becoming increasingly difficult to find. Chart 1 shows that the number of dry holes

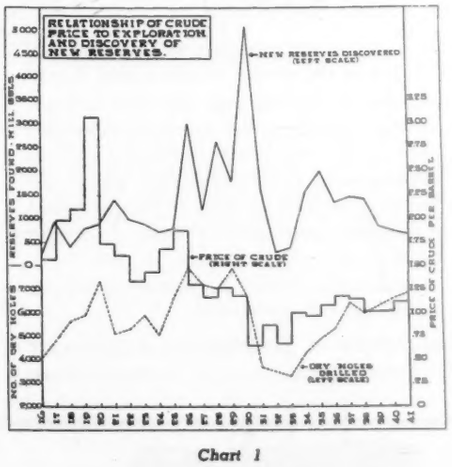
RELATIONSHIP OF CRUDE PRICE TO EXPLORATION AND DISCOVERY OF NEW RESERVES.
NEW RESERVES DISCOVERED (LEFT SCALE)
PRICE OF CRUDE (RIGHT SCALE)
DRY HOLES DRILLED (LEFT SCALE)
NO. OF DRY HOLES
RESERVES FOUND, MILL. BBLS.
PRICE OF CRUDE PER BARREL

Chart 1

drilled has increased steadily since 1933, to levels which are not far below those of 1926-30. But the curve of new discoveries has shown a downward trend since 1935. This does not mean that we have been reducing underground reserves to the extent indicated by the decline in new discoveries. Actually, our cumulative reserves have been increasing each year due to extensions of previously discovered oil fields and upward revisions of earlier estimates.

In order to correlate accurately new reserve discoveries with drilling activity and market prices of crude oil, it has been deemed advisable to credit all estimates of extensions and revisions back to the years in which the areas under consideration were discovered, as advocated by Wallace Pratt, E. L. De Golyer and other recognized authorities.

On this basis our national proven reserves on January 1, 1939, according to A.P.I. reports, apparently aggregated about 20,800,000,000 bbl. Since then we have discovered only about 2,300,000,000 bbl. of new reserves, exclusive of extensions and revisions, and produced 4,023,000,000 bbl. in the past 3 years. It becomes apparent, therefore, that our underground oil inventory has actually been reduced to the extent of 1,723,000,000 bbl. during the past 3 years.

Under normal conditions it would obviously be necessary to find from 7,000,000,000 to 7,500,000,000 bbl. of new oil supply during this next 5-year period, in order to maintain reserves at their present level.

Careful study of drilling activity outside of proven areas emphasizes the fact that exploratory drilling does not cease entirely when oil prices are at a low level. Analysis proves conclusively that many exploratory wells are drilled each year regardless of depressed price levels, not only in the hope of ultimate market improvement but also under the assurance which has thus far been provided the oil operator in being able to recover at least a part of his venture capital through the depletion allowance.

An extension of the study of oil prices and drilling activity also shows that the volume of oil produced per well, times the posted price of crude shows a marked correlation with drilling activity. Chart 2 shows a marked parallel between

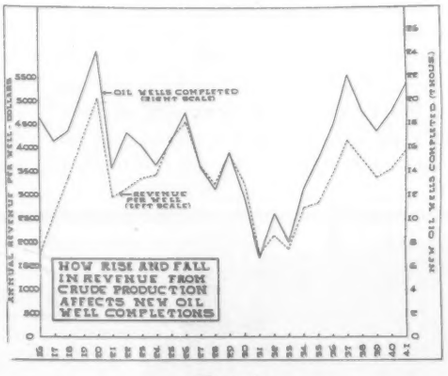
OIL WELLS COMPLETED (RIGHT SCALE)
REVENUE PER WELL (LEFT SCALE)
HOW RISE AND FALL IN REVENUE FROM CRUDE PRODUCTION AFFECTS NEW OIL WELL COMPLETIONS
ANNUAL REVENUE PER WELL—DOLLARS
NEW OIL WELLS COMPLETED (THOUS.)

Chart 2

the annual revenue per well and the number of oil wells completed.

In the peak year of 1920, when over 24,000 oil wells were completed, the average revenue per well was $5,069. By 1931 the revenue per well had declined to but $1,751 and resulted in the completion of but 6,788 oil wells and only 3,425 oil wells outside of East Texas. It will be noted that the rise in revenue per well from $3,391 in 1939 to $3,933 in 1941 was accompanied by an increase in oil-well completions of over 2,100 new wells.

The use of such data, however, must also be considered in the light of profit margins available after operating costs and overhead expenses, including taxes. This is a particularly important factor at present, when all items of cost are ascending. Bureau of Labor statistics show that oil-field wages have been advanced 21 per cent in the past 5 years, while costs of all equipment and supplies have likewise been substantially increased. It is apparent, therefore, that any advance in crude-oil prices or any increase in allowable production, which would result in increased revenue per well, must be carefully weighed against advancing operating costs.

A price index composed of an inverse ratio of supply to demand, which has for many years been used by the author as a yardstick of market values, continues to prove the premise that oil prices have not ceased to be influenced by changes in the weight of supply and demand within our own industry.

The relationship of posted crude-oil prices to the value of gasoline recovered from a barrel of crude oil shows a striking correlation. When the average price of crude oil was $3.07 per barrel in 1920, the differential over the value of gasoline recovered at the refinery amounted to 70 cents. In 1941 the differential was only 10 cents. Over the past 7 years the differential in the price of crude oil over the value of gasoline in the crude averaged 15 cents. Extreme variations during this period ranged from 10 cents to 22 cents. In 3 years of the 26 years charted, 1922, 1928, and 1929, the differential was on the minus side; the value of gasoline in crude oil exceeded the posted price of crude.

At current market prices, refinery gasoline represents an average value of $1.13 against $1.17 for crude oil at the well. If the average differential over refinery gasoline in effect over the past 7 years serves as a criterion of crude-oil value, the relative price of crude becomes $1.28 against the actual current price of $1.17. Further analysis of these ratios on a regional basis would show an even greater difference.

*Part of paper delivered at annual meeting of the American Institute of Mining and Metallurgical Engineers, New York, Thursday, Feb. 12.

Conservation in Production Now Complicated by New Factors

By E. DE GOLYER
Director of Conservation, OPC

CONSERVATION in production no longer is the simple avoidance of physical waste but now is an attempt to recover and use the greatest volume of oil with the least expenditure of steel. A year ago the oil industry said that it could meet demands by the simple process of

A.I.M.E. ABSTRACT

turning a valve but it is now increasingly apparent that this is not so. A new element has been introduced, i.e., scarcity of oil-well supplies.

In solving this problem wide spacing and pressure maintenance are vital. The concern is not whether one well to 40 acres is the proper density to secure maximum or sufficient oil, but the real problem is simply that there is only

(Continued on Page 83)

From skim milk

After the cream has been skimmed off high-grade crude to supply the straight-run constituent of hundred-octane gasoline, then:

Universal processes will produce from what is left—the skim milk—vital synthetic constituents of 100-octane gasoline, as well as high yields of anti-knock motor gasoline and fuel oil of special high heating value

The nation must have these in enormous volume—as well as aviation gasoline—to help win the war

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

THE REFINERS INSTITUTE OF PETROLEUM TECHNOLOGY

Oil and Alloys

. . . VITAL TO VICTORY

To achieve Victory, we must have Oil and Gasoline—for they are the power of our armed forces—our airplanes, ships, tanks, trucks and other mechanized equipment of war.

And to provide Oil, the petroleum industry needs steel—alloy steel, the toughest and strongest possible to produce.

It is alloy steel—Republic alloy steel—that helps insure continuous operation of drilling and pumping equipment—draw-works, pumps, rotaries, swivels, crown and traveling blocks, slips and tools. It is Republic alloy steel that helps give refinery equipment the ability to resist heavy strain and high temperatures—the stamina to carry on at peak operation without frequent costly shutdowns for repairs and replacements.

Republic—world's largest producer of alloy and stainless steels—is employing its tremendous increase of more than 700 per cent in electric furnace capacity and its unequalled experience to furnish more and more of these steels for *Production for Victory.*

REPUBLIC STEEL CORPORATION

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REPUBLIC *Alloy* STEELS

Other products include Electric Weld Casing, Tubing and Line Pipe—Upson Bolts, Studs, Nuts and Rivets—Electrunite Heat Exchanger Tubes.

International

Colombian Wildcatting Activity Centered in Magdalena Valley

By O. C. WHEELER

Chief Geologist, International Petroleum Co., Ltd.

(Author absent; paper read by chairman)

EXPLORATORY work in Colombia in 1941 was relatively low compared to former years, but leasing was active and quite a few additional concessions were taken up.

Wildcatting activity was centered in the Middle Magdalena Valley where four wells were drilled and on the Barco concession where two were completed. Most notable of the wildcats was the 1 Casabe of Compania Colombiana de Petroleos El Condor on its Yondo concession opposite Baranca-Bermeja. This well was completed with a reported initial production of 480 bbl. of 19½-A.P.I.-gravity oil per day. However, this information may have been misleading since later tests by air lift and pump indicated a smaller rate of production. The producing sand is known in the area as the upper A zone.

Compania de Petroleos de Valle del Magdalena completed a wildcat 4 kilometers northwest of Puerto Wilches. This well, the 1 Cimitarra, found good showings of gas and some heavy oil, but they were noncommercial. These showing were encountered just above the basement which was reached at 1,151 ft. The total depth was 1,484 ft.

The 1 Culimba, the third valley wildcat, drilled by Colombia de Petroleo Occidental, S.A., on the Luis Alberto Villamazar concession west of the river, was abandoned as a dry hole at 2,069 ft. The fourth was the 1 Puerto Parra of Compania de Petroleo Shell de Colombia which was abandoned at 10,929 ft. Five wildcat operations were under way in the valley at the end of the year.

On the Barco concession 2 Tres Bocas was abandoned at 1,987 ft. as the result of mechanical difficulties, and 1 Sardinata Sur was drilled to 4,717 ft., plugged back to 4,548 ft. and completed as a noncommercial well. The 1 Sardinata Norte and 2-A Tres Bocas were drilling, and 1 Socuavo was reported testing at the end of the year.

Mexico's Production Down 5 Per Cent in 1941

By T. R. ARMSTRONG

Standard Oil Co. of New Jersey

(Author absent; paper read by chairman)

CRUDE-OIL production in Mexico in 1941 is estimated at about 41,000,000 bbl., a decline of around 5 per cent from 1940 and a decline of nearly 11 per cent from 1937.

In 1941, 28 wells were listed as completions, 6 of which were regarded as abandoned because of inactivity for several years. The 14 producers were divided as follows: Northern district, 3; Poza Rica, 3; Isthmus, 8. At the end of 1941, 6 wells were reported drilling, 8 as temporarily suspended and 9 locations.

Detailed data are not available on refining, but lack of repair in recent years and troubles with nontechnical operators have beset the industry. Although sufficient crude was available last year, refined-gasoline production was probably not over 4,100,000 bbl. as compared with 7,235,000 bbl. in 1937. Instead of exporting gasoline as in 1937, last year Mexico imported about 500,000 bbl. and may have to import 1,000,000 bbl. in 1942 as a result of falling production and rising demand.

A feature of the annual meeting in New York last week of the American Institute of Mining and Metallurgical Engineers, Petroleum Division, was a symposium devoted to foreign oil production. Abstracts of several of these discussions are here printed, together with a discussion of the petroleum problems of the Axis powers.

Most of the features of the A.I.M.E. meeting were reported in last week's issue of the Journal, and additional abstracts will be found in the Engineering and Operating Section of this issue.

ESTIMATED DAILY AVERAGE PRODUCTION
(U. S. barrels)

Area—	1939	1940	1941
Northern	15,112	16,907	15,501
Southern	12,672	10,301	13,992
Poza Rica	72,115	77,481	66,866
Isthmus	17,304	15,293	16,318
Total	117,203	119,982	112,677

CUMULATIVE PRODUCTION TO END OF 1941

Area—	Barrels
Northern	757,867,000
Southern	1,032,850,000
Poza Rica	148,844,000
Isthmus	117,291,000
Total	2,056,852,000

DESTINATION OF EXPORTS
(Per cent of total)

Destination—	1939	1940	1941
United States	30.2	78.6	87.5
Latin America	2.2	1.4	12.3
Europe	64.0	15.3	0
Japan	1.0	3.8	0
Others	2.0	0.9	0.2
Total	100.0	100.0	100.0

EXPORTS OF CRUDE OIL AND PRODUCTS
(Thousands of barrels)

Classification—	1939	1940	1941
Panuco crude	4,227	2,417	1,280
Southern crude	241	1,124	1,760
Poca Rica crude	7,071	11,073	5,650
Isthmus crude	803	0	0
Fuel oil	2,089	1,340	3,330
Gas oil	1,626	2,817	2,120
Gasoline	1,488	455	1,280
Kerosene	42	269	130
Lubricants	2	1	0
Asphalt	481	516	390
Total	18,070	20,012	15,940
Bunkers: Fuel oil	833	505	310
Gas oil	157	37	0

Two Brazilian Areas Will Be Developed in 1942

By J. E. BRANTLEY

Drilling & Exploration Co.

IN October 1939 a drilling program was started with three medium, steam rotary rigs, one in the State of Alagoas and two in the State of Bahia. Eight wells were completed, two in Alagoas and six in Bahia. Two of the Bahia wells were producers.

Three medium diesel rigs were added in 1941 and 14 wells were drilled. Three were small producers in the area opened by the 1940 drilling near Sao Salvador, while another opened a new area 75 kilometers northwest. Twenty-six wells have been drilled or are drilling. Completed wells include five producers in the one area and one in the other.

Further development of the two areas and exploration of several wildcat structures will be undertaken in 1942. All the production in one area is obtained under 2,000 ft. and in the other at about 3,800 ft. The area of several wells, the Lobato field, is practically within the limits of Sao Salvador. The other is the Candeias field.

All Three Axis Powers Are Deficient in Oil

By WILLIAM B. HEROY

President, Pilgrim Exploration Co.

ALL three members of the Axis need raw materials or imports and are deficient in oil. Prewar Europe is a good example of the maldistribution of petroleum supplies. Over 95 per cent of the production is concentrated in southeastern Europe with the bulk of the consumption in the northwestern area, 95 per cent of which is supplied by imports. All of these imports were water-borne.

Next to the United Kingdom, Germany was the largest European consumer and she was dependent on her own natural production, synthetic production and imports. In 1923 Germany's natural production was only 1,000 bbl. per day but this was increased to 13,000 bbl. per day in 1939. This was insufficient and resulted in the development of synthetic processes. Production by these processes in 1938 was reported at 17,500 bbl. per day but by the spring of 1941 was estimated to have been as much as 150,000 bbl. per day. Forty plants have been mentioned specifically. Acquisition of Austrian, Czechoslovakian, Polish and French fields, the inclusion of Hungary in the Axis and domination of Rumania indicate that Germany now must have available 160,000 bbl. per day of crude oil and not less than 100,000 bbl. per day and possibly 150,000 bbl. per day of synthetic production. It is possible that she may have a total of 300,000 bbl. per day to supply normal western European requirements of 550,000 bbl. per day. It appears that her ability is not impaired by lack of oil though lubricants may pose a difficult problem, particularly in operations during a rigorous Russian winter.

A similar maldistribution is evident in the western Pacific and Japan's problem is similar to that of Germany. Japan has also stimulated domestic production but it does not exceed 6,000 bbl. per day and she gets, in addition, about one-fourth of Sakhalin's 12,000-bbl. per day production. Shale-oil deposits in Manchuria produced 1,500 bbl. per day in 1936 and a goal of 10,000 bbl. per day in 1941 and double that amount in 1943 was set. Japan also has her synthetic plants, developed with aid of Germany, that provide probably 10,000 bbl. per day. Altogether Japan's production of natural and synthetic oil is estimated at 30,000 to 40,000 bbl. per day.

(Continued on Page 92)

Natural Gas News

Relax Application of M-68 In Appalachian Region

WASHINGTON, D. C. — The pressing demand of war industries in certain parts of the Appalachian region for larger quantities of locally produced natural gas will be met by the action relaxing the application of the 640-acre gas well-spacing provision of Conservation Order M-68, it was announced by Petroleum Coordinator Harold L. Ickes.

Aid to operators in supplying the heavy and increasing industrial requirements is provided under Supplementary Order 1 to M-68, issued by the War Production Board on recommendation of the Office of Petroleum Coordinator. As a result of the supplementary order, natural-gas producers in the states of New York, Pennsylvania, West Virginia, Ohio, and Kentucky now will be able to obtain materials for new wells drilled to a uniform-spacing pattern of one well to 160 surface acres, for certain horizons, and one well to 40 surface acres for other horizons.

"It is believed that this action will temporarily assure the quantities of gas necessary for the important war industries in Cleveland, Pittsburgh, Youngstown, and other cities," said Deputy Coordinator Ralph K. Davies.

The supplement was recommended by the coordinator's office following a study made by the Natural Gas and Natural Gasoline Committee for District 1, headed by J. French Robinson, Cleveland. The office was informed, moreover, that Armf and Navy officials are in full accord with the provisions incorporated in the supplementary order and were eager that they be issued so that a maximum supply of locally produced natural gas may be assured for the remainder of the year.

Under its terms, paragraph (*b*) of M-68 has been amended so that operators in New York, Pennsylvania, Ohio and Kentucky may obtain materials to drill, complete, or provide additions to any wells drilled in conformity with the spacings provided in the order.

Wells drilled to the Onondaga limestone, Oriskany sandstone, or Devonian shale horizons must conform to a uniform spacing pattern of not more than one well to each 160 surface acres. Wells drilled to sands or horizons other than those previously named must conform to a pattern of not more than one well to each 40 surface acres.

Wells qualifying under the 160-acre provisions, however, cannot be spudded unless:

1. The drilling unit on which the well is located consists entirely of acreage not attributable to any other well.

2. No portion of the drilling unit falls within 660 ft. of an existing well.

3. All separate property interests of less than 160 acres, or in tracts on which a well cannot be drilled in conformity with the terms of the supplementary order, are consolidated to form a drilling unit of not less than 160 acres.

4. Such well is drilled at least 1,980 ft. from all wells spudded after December 23, 1941.

5. Such well is drilled at least 990 ft. from all wells spudded or completed on or before December 23, 1941.

6. Such well is drilled at least 660 ft. from any lease, property, or subdivision line that separates unconsolidated property interests.

Wells qualifying under the 40-acre provision cannot be spudded unless:

1. Same as (1) above.

2. No portion of the drilling unit shall fall within 330 ft. of an existing well.

3. All separate property interests of less than 40 surface acres, or in tracts on which a well cannot be drilled in conformity with the terms of the supplementary order, are consolidated to form a drilling unit of not less than 40 surface acres.

4. Such well is drilled at least 990 ft. from all wells spudded after December 23, 1941.

5. Such well is drilled at least 660 ft. from all wells spudded or completed on or before December 23, 1941.

6. Such well is drilled at least 330 ft. from any lease, property, or subdivision line that separates unconsolidated property interests.

REFINERY NEWS

News on refinery activity and expansion programs, formerly found on this page, has been segregated and henceforth will appear on a special page, which this week will be found on Page 55.

Natural Gasoline

Shell Oil Co., Inc., to Build East Cromwell Gasoline Plant

OKEMAH, Okla.—Shell Oil Co., Inc., has let contract to Frick-Reid Supply Corp., Tulsa, for the construction of a gasoline plant in the East Cromwell field, near here. Laying of gathering lines has already been started, and work on the plant will begin as soon as materials can be obtained. The plant is designed to produce butanes as basis stock for the manufacture of aviation gasoline.

Natural Gasoline and Recycle Condensate Production Rises in December

THE daily average production of natural gasoline and recycle condensate decreased in December 1941, according to reports received by the Bureau of Mines, U. S. Department of the Interior. The daily average in December was 8,240,000 gal. compared with 8,392,000 gal. in November. The total production for the year 1941 was 2,696,568,000 gal., or 15 per cent more than the 1940 production of 2,339,400,000 gal. Stocks continued to decrease amounting to 179,550,000 gal. on December 31 compared with 191,394,000 gal. on November 30, and 239,568,000 gal. on hand December 31, 1940.

	—Production, thousands of gallons—			
	Dec. 1941	Nov. 1941	Jan.-Dec. 1941	Jan.-Dec. 1940
East Coast				
Appalachian	9,984	9,320	92,012	82,232
Ill., Mich., Ky.	7,734	7,350	68,811	34,957
Oklahoma	32,491	33,097	381,111	399,369
Oklahoma City	5,667	6,311	70,384	81,560
Osage County	5,045	5,154	57,803	53,221
Seminole	8,657	9,008	110,371	117,944
Rest of state	13,122	12,624	142,753	146,644
Kansas	6,905	6,804	72,443	64,691
Texas	112,720	110,129	1,182,872	932,040
Gulf	33,038	31,817	302,370	199,215
East Texas	14,758	14,606	177,035	165,182
Panhandle	25,620	25,886	290,861	258,465
North Texas	2,306	2,335	27,082	44,911
West Central	4,873	4,886	59,151	61,984
Rest of state	32,127	30,599	326,373	202,283
Louisiana	24,942	25,090	183,139	113,741
Arkansas	3,086	3,149	35,394	32,096
Rocky Mountain	8,698	8,784	100,817	92,798
California	48,884	48,025	579,969	587,476
Huntington B.	2,663	2,523	31,696	31,628
Kettleman Hills	9,864	9,608	115,568	127,259
Long Beach	7,223	7,124	88,290	89,631
Santa Fe Spgs.	4,527	4,444	55,540	56,839
Ventura Avenue	5,268	5,271	58,107	64,132
Rest of state	19,339	19,055	230,768	217,987
Total	255,444	251,748	2,696,568	2,339,400
Daily average	8,240	8,392	7,388	6,392
Total (thousands of barrels)	6,802	5,994	64,204	55,700
Daily average	196	200	175	152

Prepared under the supervision of G. R. Hopkins, Petroleum Economics Division, Economics and Statistics Branch.

Shipments to jobbers and retailers increased while shipments to refinery-owned bulk plants decreased in December and were 43,512,000 gal. and 6,300,000 gal. compared with 32,340,000 gal. and 8,358,000 gal., respectively, in November. Average vapor pressure increased for shipments to refineries and refinery-owned bulk plants and decreased for shipments to jobbers and retailers. The weighted average for all shipments was 20.2 lb. compared with 20.4 lb. in November, and 20.7 lb. in December 1940.

NATURAL-GAS DELIVERIES TO PIPE LINES AT WELLS IN MONTANA FIELDS DURING YEAR 1941

Compilation by Oil Conservation Board of Montana from reports made to State Board of Railroad and Public Service Commissioners, records of U. S. Geological Survey and other sources.

(Figures represent 1,000 cu. ft.)

	Wells producing or shut in 12-31-41	January	February	March	April	May	June	July	August	September	October	November	December	Total
Bowdoin and Saco	93	261,465	211,641	190,927	139,772	133,620	142,005	148,851	154,098	196,540	234,725	247,090	374,120	2,334,854
Bowes	13	124,821	101,927	42,204	27,659	10,656	14,116	10,914	7,060	33,394	93,025	52,341	58,405	576,522
Box Elder	7	63,689	53,946	22,704	11,830	9,892	2,266	1,381	7,142	12,942	75,145	99,539	118,917	479,393
Cedar Creek	159	771,543	652,221	614,957	571,096	442,199	400,383	388,512	364,214	371,377	666,125	720,906	726,063	6,689,596
Cut Bank	87	1,201,534	1,039,419	1,042,012	926,944	840,096	720,263	674,204	726,047	862,608	993,747	1,121,132	1,271,583	11,419,589
Devon	9	31,374	0	1,087	27,274	30,046	28,140	30,746	31,245	30,741	32,597	30,484	36,930	310,664
Dry Creek	6	119,395	111,910	94,061	92,553	63,032	54,748	54,460	53,340	74,738	90,859	111,647	139,638	1,060,381
Hardin	61	13,151	11,421	11,514	9,006	3,854	2,281	1,547	1,481	2,583	5,883	7,877	11,473	82,071
Haystack Butte*	1											5,818	7,334	13,152
Kevin-Sunburst	190	367,511	291,377	316,791	301,539	264,025	236,339	213,737	198,833	248,005	293,031	314,044	363,240	3,408,472
Whitlash	17	126,126	126,459	127,586	62,444	41,093	32,077	33,204	48,706	71,508	88,994	102,712	123,116	984,023
Total	643	3,080,609	2,600,321	2,463,843	2,170,117	1,838,513	1,632,618	1,557,556	1,592,166	1,904,434	2,574,131	2,813,590	3,130,819	27,358,717

*First production, November 1941.

PROGRAMS AND MEETINGS

A.P.I. Meeting in Dallas, February 26-27

The final program has been issued for the spring meeting of the southwestern district, Division of Production, American Petroleum Institute, which will be held at the Adolphus Hotel, Dallas, Tex., the latter part of next week. The theme of the meeting will be "All-Out Cooperation to Win the War."

The meeting will extend over 2 days, February 26 and 27, with an informal entertainment program on the evening of February 26, and a "Victory Dinner" on the evening of February 27.

Following is the program for the meeting:

Thursday, February 26

8:00 a.m. Breakfast meeting for presiding officers, authors, and discussers.

8:30 a.m. Registration.

10:00 a.m. Morning session: Presiding, E. P. Hayes, Texas Co., Houston, Tex.; D. V. Carter, Magnolia Petroleum Co., Dallas, Tex.

1. Opening remarks by E. P. Hayes, district chairman.

2. Reports by southwestern district chapter chairmen.

3. Paint Programs to Prevent Corrosion and Evaporation Losses, P. L. Lotz, Socony Paint Products Co., New York, N. Y.

Discussion.

4. Caliper Well Surveys and Their Value, C. P. Parsons, Halliburton Oil Well Cementing Co., Duncan, Okla.

Discussion.

12:15 p.m. Luncheon—District and chapter officers at Adolphus Hotel, E. P. Hayes, presiding.

2:00 p.m. Afternoon session: Presiding, B. C. Craft, Louisiana State University, University, La; H. B. Hill, U. S. Bureau of Mines, Dallas, Tex.

1. Subsurface-Pressure Regulation of High-Pressure Condensate Wells, John O. Farmer, Otis Pressure Control, Inc., Dallas, Tex.

Discussion.

2. Back-Pressure Tests on Gas-Condensate Wells, A. L. Vitter, Jr., State of Louisiana, Department of Minerals, Oil and Gas Division, Baton Rouge, La.

Discussion.

3. Multiple-Zone Completions, E. O. Bennett, Continental Oil Co., Ponca City, Okla.

Discussion.

5:30 p.m. to 7:00 p.m. Informal entertainment. Dallas Petroleum Club, sponsored by the Dallas Wildcats. Ladies invited.

Friday, February 27

8:00 a.m. Breakfast meeting for presiding officers, authors, and discussers.

10:00 a.m. Morning session: Presiding, J. H. Rambin, Texas Co., New Orleans, La.; W. S. (Buck) Morris, East Texas Engineering Association, Kilgore, Tex.

1. Civilian Defense, R. E. Smith, director, Eighth Region, Office of Civilian Defense, San Antonio, Tex.

2. Application and Value of Draw-Down Tests on Oil Wells, J. Daviss Collett, Jr., Houston, Tex.

Discussion.

3. Improvement in the Treatment of Crude Oil-Water Emulsions, R. C. Buchan, Humble Oil & Refining Co., Houston, Tex.

Discussion.

4. Report of nominating committee; election of officers.

12:15 p.m. Luncheon meeting, southwestern district committee on production practice, W. A. Alexander, chairman.

2:00 p.m. Afternoon session: Presiding, R. O. Garrett, Arkansas Fuel Oil Co., Shreveport, La.; F. E. Heath, Sun Oil Co., Dallas, Tex.

The Oil Industry in National Defense.

This session will be devoted to subjects and speakers on topics relating to cooperation with the Government in the national war emergency.

1. General Principles and Philosophy of Restrictive Orders, D. R. Knowlton, associate director of production, Office of Oil Coordinator, Washington, D. C.

2. Procedural Policies, E. O. Buck, assistant district director on production, District 3, Houston, Tex.

3. Address by Judge Walace Hawkins, general counsel, Magnolia Petroleum Co., Dallas, Tex.

7:00 p.m. "Victory Dinner." Inspirational music and address. Ladies invited.

Address by the Honorable Hatton W. Sumners, member of Congress, Washington, D. C.

East Texas A.P.I. Chapter Meeting Will Feature Priorities Discussion

James E. Hughes, chief priority specialist of the OPC, has been engaged as speaker to address members of the East Texas chapter of the American Petroleum Institute, at the chapter's meeting at the Kilgore High School Auditorium, Friday, February 20, at 8 p.m. As an added feature, C. B. Capers, Gladewater, Tex., defense coordinator for the East Texas area, will briefly explain the functions of the local defense agencies.

The regular dinner honoring the speakers will be held in the Kilgore Hotel at 7 p.m.

A.P.I. 1942 Mid-Year Meeting Cancelled

The twelfth mid-year meeting of the American Petroleum Institute, scheduled for May 25 to 28 at Oklahoma City, Okla., has been cancelled, W. R. Boyd, Jr., A.P.I. president, announced last week.

"This action has been taken by the Institute's executive committee upon my recommendation," Mr. Boyd said, "because so many of the members of the Institute, and especially of its working committees, who normally attend mid-year meetings, are actively engaged in war work."

North Texas Association Will Meet in Wichita Falls, Feb. 28

The annual meeting of the North Texas Oil and Gas Association will be held in Wichita Falls, Tex., on Saturady, February 28.

The meeting includes an appropriate divertisement during the afternoon and a banquet at the Woman's Forum during the evening .

Newly elected officers will be installed at that time. They are J. A. McCarty, president; Fred Sehmann, first vice president; Homer Lee, second vice president, and D. G. Gray, executive vice president.

Frank W. Buttram, president of the Independent Petroleum Association of America, and one of the ranking officials of the Office of Petroleum Coordinator, will address the banquet audience. The speakers will naturally discuss the position of the oil industry in relation to necessities of war, which will attract wide interest among oil producers.

Wirt Franklin Addresses Oil Men at Illinois Meeting

MOUNT VERNON, Ill., Feb. 17.—An appeal to oil men to put aside selfishness and greed, to acquiesce to the government program for the industry, and to endure slight sacrifices necessary for the duration of the war was made by Wirt Franklin, director in charge and director of production for District 2, Office of Petroleum Coordinator, Chicago, at a special dinner meeting of the Independent Oil Producers Association of Illinois in Mount Vernon, February 12.

Mr. Franklin was honor guest and speaker at the dinner, which was attended by oil men not only from all parts of the Illinois basin but from other areas as far away as Tulsa, and by numerous state and federal oil-regulatory officials and other specially invited guests. Reservations had been made for only 200 persons, Elmer W. Ellsworth, executive secretary, said, but this number was greatly exceeded by the attendance. Harold S. Williams, Taylorville, Ill., president of the Illinois group, presided.

Provisions of OPM orders M-68 and P-98, as well as the new program for allocation of production on the basis of reserves as established by the Office of Petroleum Coordinator, were freely discussed by Mr. Franklin.

"The 40-acre spacing rule will remain in effect as long as it is necessary to get steel for the war effort," Mr. Franklin warned. "Steel, not dollars," he said, "will be the measure of value in the oil industry for the duration. Oil is the most important single thing in the war effort but we must have tanks, planes and other equipment to use that oil to good advantage."

"Order M-68 contemplates we shall have both oil and steel—enough oil for the present purpose," Mr. Franklin continued. "We must produce our oil so we can get the most possible from proved areas. You don't have to get all this oil out tomorrow. In the later emergency, we can go back to those 40-acre fields where we know the oil is, and get it. The 40-acre order is what the doctor ordered to assist in the preservation of our liberties."

Mr. Franklin said that it is essential that the rates of production recommended by the petroleum coordinator be met without delay.

"To assure the nation of an adequate supply on a sustained basis, the haphazard system heretofore followed by the separate states in supplying demand no longer can be permitted," he declared. "Premature exhaustion of the reserve of any one state will throw an undue burden on the other states. We do not know how long this war may last, and we must provide a sound program whereby each state can contribute suitably to the national need. It is necessary to view the problem of crude supply in its national aspect to meet the requirements of the war program."

Mr. Franklin explained how the quotas were determined and said that consideration was given to market demand and the ability of wells to produce at a given rate for a given time, and that the proportion of the known reserves of each state were considered in proportion to the known reserves of the nation. He gave assurance that prior consideration will be given stripper wells.

"The OPC does not intend proration of stripper wells, for that would lead to premature abandonment and that must be avoided," he stated.

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ENGINEERING AND OPERATING SECTION

FEBRUARY 19, 1942

Paraffin Removal by Heated Oil

By T. P. SANDERS

Deposition of paraffin in tubing in wells in the East Texas field occurs between 1,000 and 1,200 ft. This paraffin has a melting point between 145° and 150° and can be removed by pumping hot oil into the tubing. A steam generator and a heat exchanger are used on the surface and a special valve is installed on the tubing.

A NEW paraffin-removal method employing hot oil has been perfected during recent months in the East Texas field. As compared with methods formerly used in the field, the new procedure offers the advantages of reduced treating time, more thorough cleaning, avoidance of the necessity of disturbing rods or tubing, and absence of the unsightly pile of discarded paraffin about the well head.

Although the method depends upon heated oil to dissolve the paraffin from within the tubing string, the hot fluid is not circulated. It is merely forced into the tubing to displace the cold oil, then pumped out with its load of dissolved paraffin when the well is put back on production. In order to make this operation possible it is necessary to install a simple pressure-release valve in the tubing through which the cold oil can be displaced into the annulus. This valve is placed about 1,000 ft. below the interval of paraffin deposition, and hot oil is applied only to the portion of the tubing in which treatment is needed. This fact contributes greatly to the economy and time-saving features of the method.

The new dissolving method can properly be considered an outgrowth of the experiments in which hollow sucker rods were used to facilitate paraffin removal. Sucker-rod strings, the top 1,200 ft. of which were hollow, were run in wells showing paraffin trouble. The hollow string provided an ideal means for introduction of paraffin solvent into the oil column. It also permitted circulation of hot fluid for melting paraffin. The results of experiments with paraffin solvents, however, proved the method to be too expensive, considering rod costs, breakage, and solvent costs. Circulation of hot oil or steam also proved to be comparatively ineffective because of the low rates of circulation that could be maintained through the ⅝-in. passage within the rod string. The hollow-rod experiments are of interest mainly in that they called attention to the superiority of hot oil over steam as a paraffin-removing medium.

After noting that paraffin dissolved out of the tubing by hot oil showed little tendency to redeposit on cold sections of rods and tubing, Frank Dana, of Delta Drilling Co., set out to devise a more effective method for introducing hot oil directly to paraffin deposited in the tubing. The side-door ball-and-seat check valve with adjustable spring to regulate the discharge pressure was adopted as the simplest means for permitting displacement of cold oil in the tubing with hot oil from the surface. The next step was to assemble portable surface equipment that could heat oil quickly and could pump the hot oil down the tubing rapidly with enough pressure to force open the side-door spring-loaded valve. The truck-mounted equipment, which is of novel design, is described later in this report.

East Texas Paraffin Conditions

Paraffin formation in the East Texas field is not considered especially severe when compared to Texas Panhandle conditions. However, many wells have been requiring a rod-pulling job once every 2 or 3 months to obviate the more serious paraffin troubles, and during the colder weather many lead lines become clogged if they are not given frequent attention.

Paraffin deposition in the tubing is apparently greatest at depths between 1,000 and 1,200 ft. Here the oil in the tubing is cooled either due to the presence of water sands or due to gas coming out of solution, or by both. The paraffin deposited has a melting point of 145° to 150° F.

In general two methods have been in use for removing paraffin: mechanical scraping and circulation of steam. Use of steam has been limited because of the excessive cost of rigging up the surface connections. Since the entire length of tubing must be heated, a considerable volume of steam is required to avoid reformation of paraffin at a higher level in the tubing.

Experiments with oil containing 33 per cent paraffin showed that a temperature drop down to 75° F. brought about paraffin deposition on a metal surface to the extent of a coat of paint. When paraffin is dissolved from the tubing with hot oil, the paraffin fraction seldom becomes more than 25 per cent. It is therefore believed that the redeposition of paraffin taking place when heated oil cools in the tubing represents a negligible amount, and can be compared with the initial rate of deposition in which it has been seen that several months' production contributes to build up a troublesome deposition of paraffin.

Recent experiments with Texas Panhandle crude showed that when the wax content is as great as 41 per cent, a temperature of 100° F. will reduce to a fluid state all of the paraffin between the tubing and rods*. This example serves to indicate the paraffin-dissolving property of hot oil, but since the tests were made on Panhandle oil, the quantitative results would not necessarily prove true for East Texas crude. Also, the oil in the Panhandle tests was heated by means of electricity applied to the tubing, and such application may result in dislodgment of the paraffin deposition at a lower temperature than when it is dissolved directly by hot oil.

Surface Equipment

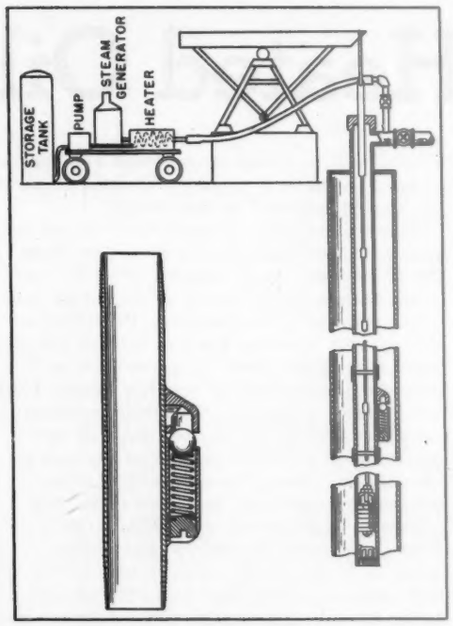
In order to get hot oil down to the necessary depth in the tubing at a temperature sufficiently high to melt the deposit, a surface temperature considerably above the melting point of paraffin is required. Such a temperature would expose op-

*Turner, Benton, and Rider, C. R., The Oil and Gas Journal, March 6, 1941. p. 37.

Heat-treating truck showing steam generator capable of producing steam for heating the oil in 20 seconds

erators to fire hazard if employed with an open system. Therefore a closed-oil system, tested to provide high pressure and high temperature has been supplied. The entire equipment is mounted on one truck. It consists essentially of a steam generator, a heat exchanger, an engine driving a triplex pump, an oil-metering system, and storage tanks for crude oil, fuel, and water.

The steam generator is of special interest, since it is capable of supplying steam in 20 seconds and can develop a steam pressure of 350 lb. 2 minutes after starting. It was designed initially for heating streamlined trains after the acceptance of the diesel locomotive had done away with the usual source of heat for Pullman cars. Quick heat is due to spark-firing of the light diesel oil or kerosene that is burned, and also because of the fact that the entire fire box is lined with small-diameter



Schematic drawing of hot-oil paraffin-removal method showing check valve in tubing through which cold oil is displaced when the hot oil is pumped down from the surface

water tubes which are tested at 500 lb. pressure*.

Crude oil, carried on the truck in an 8-bbl. tank, is heated by steam in a coil-type insulated heat exchanger, usually to 300° F., and is then pumped down the tubing at a rate of 20 bbl. per hour. A common speedometer on the engine shaft is calibrated to measure the oil discharge in gallons or barrels, and the operator is thus able to halt the hot-oil stream short of the check valve. This prevents melted paraffin from being ejected into the annular space outside the tubing.

Since the truck carries a flexible connecting hose and all other necessary fittings, and since the well is not disturbed other than to shut down the pumping unit, the application of hot oil is quickly consummated and seldom requires over 45 minutes. Treatment of an average well was witnessed and the entire operation was found to require 30 minutes. The time allotted for hot oil to remain in the tubing appears to be unimportant. All the paraffin is dissolved within a few minutes by the oil, but the hot-oil charge is often left in the well over night without appreciable redeposition of paraffin. It is of course best to put the well back on production before the oil cools so that the heat will contribute to the melting of paraffin in the lead line to the tank battery.

*Simons, Harry F., The Oil and Gas Journal, April 3, 1941, p. 70.

Temperature drop in the tubing was checked in one well by pumping the hot-oil charge out after selected periods of time. From an initial of 287° F. the temperature dropped to 106° in 42 minutes, and in 1 hour and 40 minutes it dropped from the same initial down to 68° F.

In order that a well can be treated by the displacement method described above, it is, of course, necessary that the side-door check valve be installed in the tubing prior to the time of treatment. If the well is not equipped with this special valve, it is still possible to heat treat but the standing valve and traveling valve must be picked up out of the working barrel to permit displacement of cold oil from the tubing as the hot oil is pumped in. In this case a pulling unit is required in addition to the oil-heating truck. By making it unnecessary to raise the rods, standing valve, and pump plunger the side-door check valve pays for itself and its cost of installation in five or six hot-oil applications.

Input-oil temperatures up to 450° F. with a pressure of 1,000 lb. can be attained with the mobile Delta unit. With these temperatures and pressures it has been found that the unit is capable of removing paraffin from completely clogged lead lines or from any other equipment in which deposition may occur.

If a well has been pumped too long without paraffin removal, the pump plunger may be seized by hard paraffin when a rod job is attempted for mechanical cleaning. This ordinarily means a stripping job. However, the hot-oil unit is capable of saving the stripping job even if the plunger is stuck so fast that it can be moved neither up nor down. Oil at maximum temperature pumped down the casing has been found successful in melting the paraffin to release the stuck plunger.

Delta Drilling Co. assembled the unit described for use in maintaining its own wells. Recently services of the heat-treating unit have been made available to other operators in the East Texas field.

SAFETY — Pull-Rope Starter Replaces Crank

CRANKING of engines is always dangerous business as anyone who has had experience with old-model cars knows very well. Twenty years ago the sight of a man walking down the street with his arm in a sling was quite common. In most cases it was due to being kicked by the crank while trying to start a car which was slightly out of time.

Industrial engines used in the production and drilling departments of the oil industry are much larger and have a higher horsepower rating than automobile engines. A blow from a kicking crank is therefore much more dangerous and will generally do much greater damage.

For the oil business to stay profitable, it is necessary to keep down the investment as much as possible and the equipping of the engines used in the oil fields with electric starters would amount to a major item. In many cases the engines are run almost continuously, being stopped at regular intervals each day for oiling and greasing. If the engines were stopped and started more frequently, the addition of starters might be justified.

However, it takes only one kick of a crank to do serious damage and while the danger does not warrant the installation of starters, it does merit some attention to prevent injury to pumpers while cranking engines.

One company operating in the Seminole area of Oklahoma has equipped its pumping engines with starting pulleys in place of cranks. Essentially, these are the same as the cranking pulleys on outboard motors and other small engines, a rope being placed in a slot and wound around the circumference of the pulley.

During cold weather, when the cranking is difficult, more than one man may be required to crank the engine. This is made easier when a rope-cranking arrangement is used as several men can be used to jerk the rope. This is a common method used to start rotary drilling engines provided with a crank, the rope being attached to the crank handle, in that case.

The pulley is made from salvaged material.

Internal Scrapers Adapted to Gas and Vapor-Carrying Lines

By R. MARNE SANFORD

Efficiency of lines transporting gas is greatly affected by the internal condition of the pipe. The presence of scale, water or roughness in the pipe will cause the actual carrying capacity to vary from the capacity as computed by Weymouth's formula. By running scrapers through the pipe, the capacity can be increased in some cases to greater than the calculated capacity.

INTERNAL pipe-line scrapers, more commonly known as "go-devils" or "rabbits," have for a number of years been in practical use for cleaning oil, gasoline and water pipe lines. It has been only in the past 3 to 5 years that experimental work has been started with regard to their adaptability to natural-gas pipe lines. This discussion will trace the background work concerning go-devils in gas lines and will present the methods and results of United Gas Pipe Line Co., Shreveport, La., work with this implement and similar devices invented by that company.

Whereas fluid-carrying pipe lines become clogged or corroded with paraffin, sludge, etc., or become eroded by sulfur compound or oxidation or iron, a vapor or gas-carrying line has an altogether different problem for the internal scraper to combat. For cleaning a gas line a device is required which will clean the internal walls of the pipe by scraping on its every surface through the entire length of the line. It has to pass through sharp under, over and side bends, bypass enough gas to keep the incrustations that are knocked loose moving ahead of the scraper, clip off welding burrs, push out debris left in the line during construction, push out depositions and products of corrosion; and must be sturdy enough to withstand many miles of operation at both high and low speeds and stand the shock of being violently stopped at the end of the run.

At Houston, Tex., in May 1940, at the American Gas Association meeting, Raymond Ransom, of Panhandle Eastern Pipe Line Co., presented a paper discussing how incrustations and deposits on the walls of pipe lines reduced the carrying capacity of the gas pipe lines out of all proportion to the actual decrease in pipe diameter, and C. H. M. Burnham, of the same company, gave its experience in cleaning 265 miles of 24-in. line in western Kansas that was fouled with sand and iron oxide. They had run a revolving, brush-type cleaner 346 miles through the line.

In 1936 Frank J. Trelease, of Ford, Bacon & Davis, Inc., reported at an A.G.A. meeting how Colorado Interstate and Candian River Gas Co. had increased the efficiency of its Amarillo-Denver 22-in. line from 85.9 per cent of normal to 106.7 per cent of normal.

In 1939 Northern Natural Gas Co., Omaha, Neb., reported on the go-devils that were used in restoring gas-carrying capacity to a 24-in. line which had been reduced by mud, rust and dust to 75 per cent of normal.

These are about the only early written reports on the results of work of this type with internal scrapers on gas lines. However, several gas-transportation companies have now passed the experimental stage with go-devils. Nevertheless, the application of the free-moving internal scraper used in gas lines is still generally considered to be in an early stage of development.

For experimental purposes, United Gas Pipe Line Co.'s problem was turned over to W. R. King, chief engineer of the Mineola compressor station, at Mineola, Tex. Mr. King incorporated some of the features which are similar to the Trelease scraper as well as some further improvements suggested by the original designer. Actual experimental work in pipe lines of the company was started in 1940 and has been carried on continuously since then. Results, both favorable and unfavorable at times, have materially added to the knowledge of gas-line cleaning with go-devils, until at present full-scale cleaning operators as an integrated part of line maintenance are planned by the company as well as some other natural-gas-transportation companies which have been experimenting with the same problem.

Internal Depositions Multiply Fraction Factor

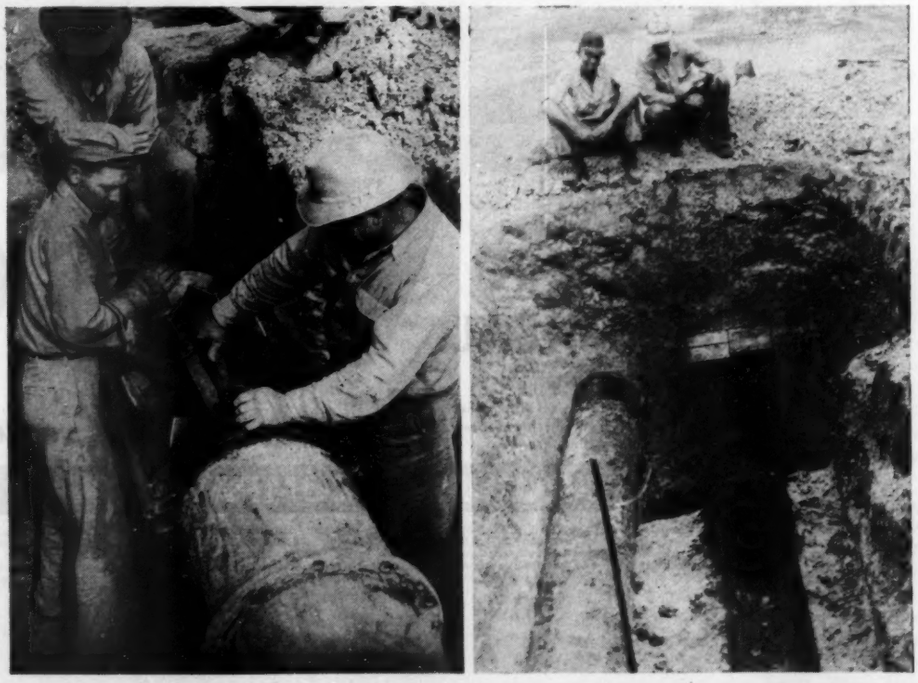
The Weymouth formula for computing pipe-line capacities has long been accepted as standard. With certain compensations, however, this is a formula based on smooth interior pipe. Friction is the most important factor in transportation of natural gas through a pipe line. Increased depositions on the interior of the pipe distort the friction factor as applied to the Weymouth flow formula. One of the preliminary tests to determine whether a line is performing satisfactorily is to compare the volume of gas being carried under the pressures existing at various points with the volume predicted by the Weymouth flow formula, which is the standard.

These tests only check the resistance to flow of the system, to see if some unusual condition has occurred to cut down on its carrying capacity. The presence of liquids in the lines sometimes occur and has this capacity-lowering effect. To remedy this, dehydration units, separators, drips, siphons and other mechanical devices at gas wells and along the lines have been installed. If if is found that liquid is not responsible it can be deduced that the interior of the line has become fouled to the extent that cleaning operations are necesary to restore capacity.

In addition to resistance to flow of gas offered by foreign objects, such as water, in the line, there is friction between the gas and the pipe wall, but most important in gas lines, a friction also exists between layers or sections of the gas itself in its usual condition of disturbed movement.

The go-devil or scraper itself may be one of many designs. The conventional types used in oil and gasoline lines are about 3 to 4 ft. in length and the scrapers are of some reasonably soft, pliable material, usually rubber or cordage. The scraper is inserted in the line and moves along with the fluid column and is recovered at the desired point.

Differing from this type, the gas-line go-devils



Left: With large jacks the go-devil is elevated into position for insertion into the line. Right: A go-devil after it emerged from the length of the section. Note the pup joint rolled to one side and the clogging debris

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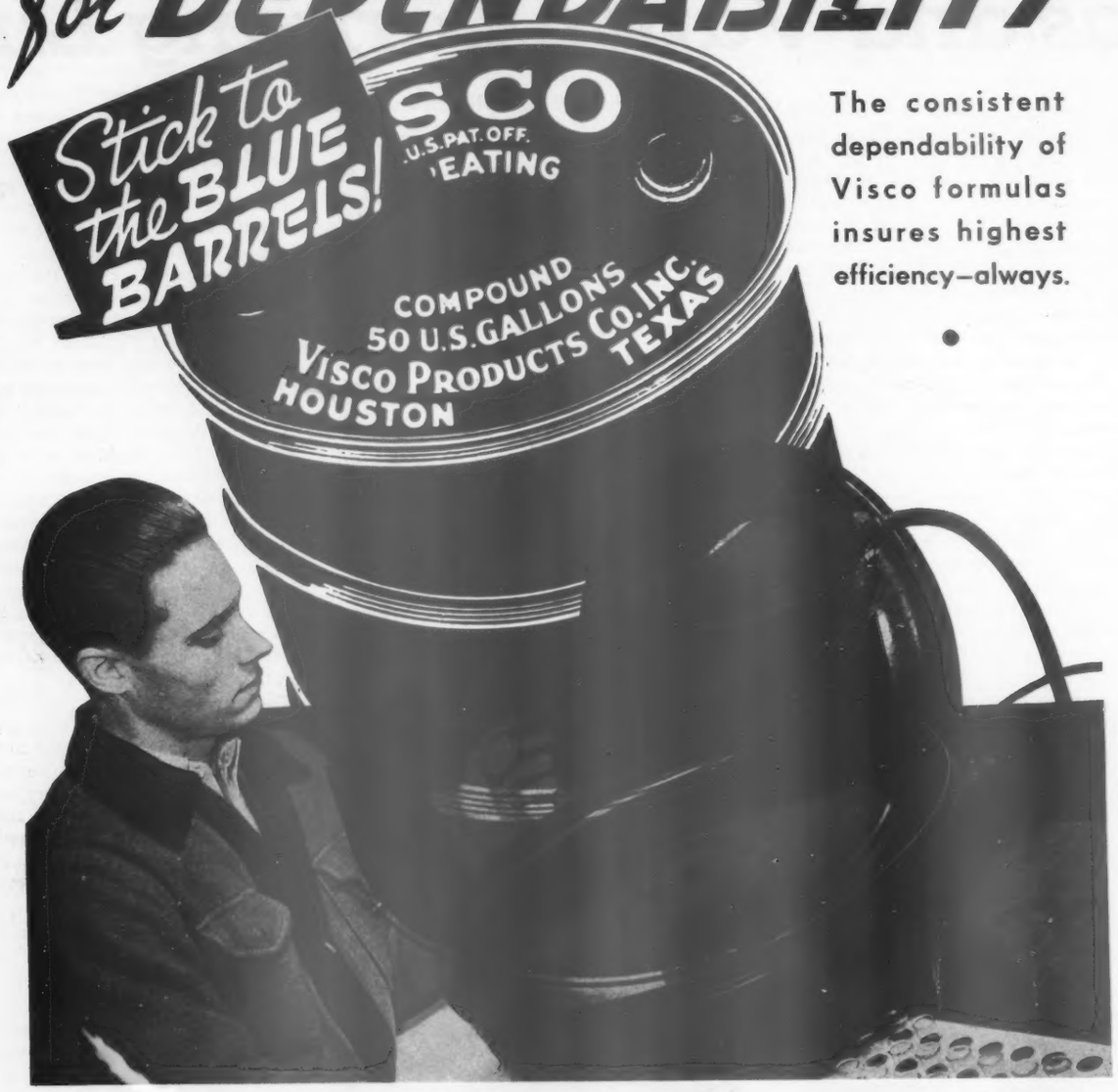

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are somewhat larger, being from 5 to 7 ft. in length and the scrapers or blades that contact the pipe walls are of steel. They may be either sharp blades for cutting hard incrustations and welding burrs, or may be wire brushes and scrapers combined for cleaning out dryer yet less-resistant depositions in the line. Some gas lines, due to the pressure and temperature variations inside and outside, have considerable quantities of liquids, mostly water, in the form of a sludge. The scraper or cutting-type go-devil has been tried but without apparent success as yet in removing this type of sludge.

Most important is the speed and control of the scraper while in the pipe line. Unlike oil and gasoline lines, the gas line must be entirely out of use while being cleaned. The go-devil is inserted into the line and a pressure differential of about 3 to 5 lb. is necessary to start it moving. With a pressure gradient of 5 lb. pushing the scraper, enough gas is bypassed through or around the scraper to make the gradient about 3 lb. on the downstream side. The downstream end of the pipe is open and if it is desired that the scraper travel 20 m.p.h. through the pipe, then sufficient gas is admitted behind it in 1 hour to fill a 20-mile section of pipe at the pressure maintained during the operation. With the difference in pressures in front of and behind the go-devil it will travel 20 m.p.h. through the pipe. The velocity is controlled by the quantity of gas admitted in excess of the bypassed volume. With this formula or by this means, any desired speed can be calculated for any given length of pipe.

Made For Definite Size Lines

All go-devils must of necessity be made for a specific diameter of pipe. The circumferential angle of the blades of go-devils used in, say 10-in. pipe, would not effectively scrape the walls of an 18-in. pipe due to the difference in the angle of the larger-size pipe. Where rubber or soft material is used for crude and gasoline-line go-devils, different-size scrapers would fit varying-size pipe.

All go-devils used by this company were hand machined in the company shops and were constructed so field repairs could be made on unforeseen mechanical failures.

The go-devils thus far made by the company have cost from $75 to $350, but an average cost would be about $200. Considering the long life of the equipment, and considering the fact that some line capacities can, according to the Weymouth formula, be increased in efficiency and thus carrying volume, by some 10 to 15 per cent, the cost of the equipment and the cost of maintenance is practically negligible.

The first United Gas Pipe Line Co. go-devil went into operation on September 29, 1940, on a 1.9-mile section of the Latex-Magasco 16-in. line on the Gulf Coast. On the first design a double series of blades was attached to retractable pistons held in place by automobile springs.

Gas was drained from the section between closed gate valves at a time when other maintenance work was in progress. The line was raised at the downstream end of the section and also at the inlet end. An orifice plate was inserted at a flange in the bypass around the upstream gage, and a gage connection was installed to record the propelling pressure. The scraper was jacked into the raised inlet lipe which was then lowered and coupled to the upstream end.

Gas was first admitted slowly to purge any air from the line, and then increased until the scraper started on its journey, sounding something like a freight train pulling up a sanded hill. Three minutes later the scraper hung up ¾ mile downstream and was located by a line walker. In dislodging, the scraper passed through a buckle in an overbend and was permanently damaged. From this and one subsequent attempt to clean the same line, the design and pattern were determined for the present successful go-devils.

Remove Gum

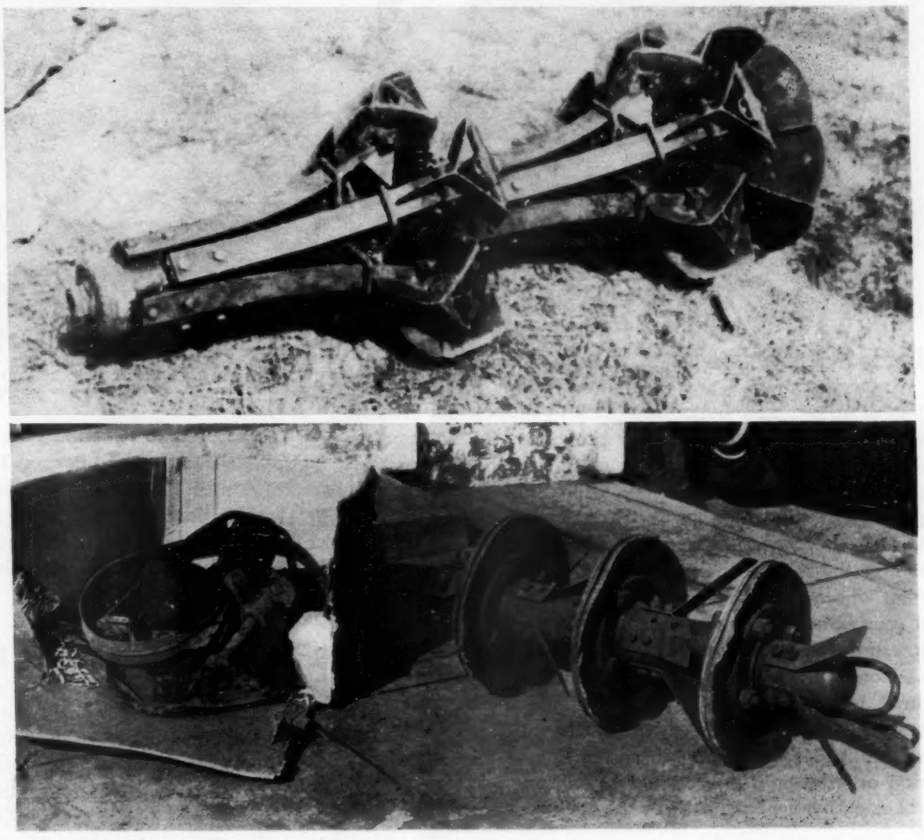
An effort was made in July of 1941 to restore capacity efficiency to a section of 16-in. line in the company's Houston district between Edna and Refugio. This line had an excessive inner coating of gummy paste consisting of oily iron oxide. Due to the gummy action of the deposits the conventional scraper did not get satisfactory results. Development of a successful cleaner for the types of deposits found in this line was continued in the research department of the company, and there was developed a swab consisting of three diaphragms of heavy belting mounted between flanged spools. This swab was used successfully in connection with the King scraper in the Shreveport district on the Rodessa-Pine Island 12-in. line where fluid removal was also needed. Twenty-six barrels of fluid, muck and iron oxide were removed from 9 miles of this line. Further work is in progress in the research department on a combination swab and brush-type cleaner for gummy deposits.

The King design proved most successful in the San Antonio district. On the Bruni-Comal line, from Orange Grove to Pettus Crossover, Mile Post 59 to Mile Post 108, pressure-drop reports from 1936 to 1939 indicated an average efficiency of 90 per cent of normal for the line. In the following 2 years as the result of an intensive fluid-removal campaign a great amount of water, accompanied by solids in suspension, was removed, and in the spring of 1940 the line's efficiency had risen to 103 per cent of normal.

Believing the line was still fouled with internal deposits and incrustations, scraping operations were begun in July and by August of 1941, with 18 miles of the 49 miles cleaned, capacity had risen to 105.2 per cent of normal. On October 31, with the entire line cleaned, capacities had risen to 112.9 per cent of the volume predicted by the Weymouth formula. Thus the line's efficiency was increased by 13 per cent due to the fluid-removal campaign, and an additional 9.9 per cent efficiency was restored by the go-devil cleaning, thus increasing the capacity over-all from 90 per cent to 112.9 per cent or a total of 22.9 per cent increase.

This standard Weymouth flow formula holds well for average lines with average loads, but under high gas velocities the predicted results are too low. It so happens that in many cases the flow rate is such that the underestimation of the Weymouth formula approximately compensates for the absence of true 100 per cent flowing efficiency in commercial-gas pipe lines. However, for years certain lines of the company and of other companies as well, have operated above 100 per cent of the formula, and it is now realized that this is not a freak condition but one that can be duplicated by any relatively smooth line carrying gas at a high velocity.

The United Gas Pipe Line Co., as is the case with other commercial gas-pipe-line transportation companies, must clean, repair and test its lines only during the slack season of the year when the facilities are not taxed to the utmost. Based on the large loads which the company lines are carrying this winter, conditions for obtaining accurate performance tests are practically perfect, and as a result of these performance tests the company plans for an expanded internal pipe-line-cleaning campaign for all of its lines.



Top: The second type of go-devil designed by the company. The springs beneath the blades have been removed and the whole scraper somewhat simplified from the first design which was irreparably damaged on its initial run. Bottom: A pliable disk swab and some of the debris which was blown out of the lines

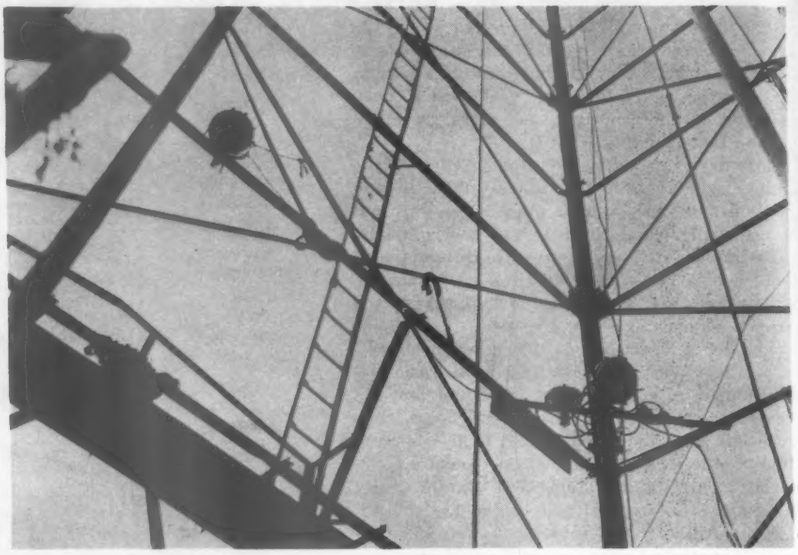
Operating Ideas

Jack Supports Mud-Line

Use of an ordinary boiler-front jack to support the mud return line from the blowout preventer to the mud ditch, is made on drilling rigs of a Texas Gulf Coast operator. The jack is equipped with a yoke, which, in place, half surrounds the pipe, at right angles to it. It is set under the pipe on heavy blocking, and elevated to take the load of the pipe. Placed close to the flange joint where the line makes a 90° change in direction, it carries not only the run, but also the weight of the line tying in with the mud ditch, and relieves the connection at the blowout preventer of all stresses except those imposed by the flow of the mud. At the same time, it makes possible exact adjustment of the height of the line. Any slight shift of the line due to expansion or vibration is absorbed by slippage across the yoke, or by a slight shift of the jack itself.

Rack For Treating-Compound Barrels

It is no job for the pumper on this lease to draw the needed amount of chemical from the barrels. The simple frame is made of 2-in. tubing and the barrels can be unloaded directly from the truck or can be skidded up the incline.

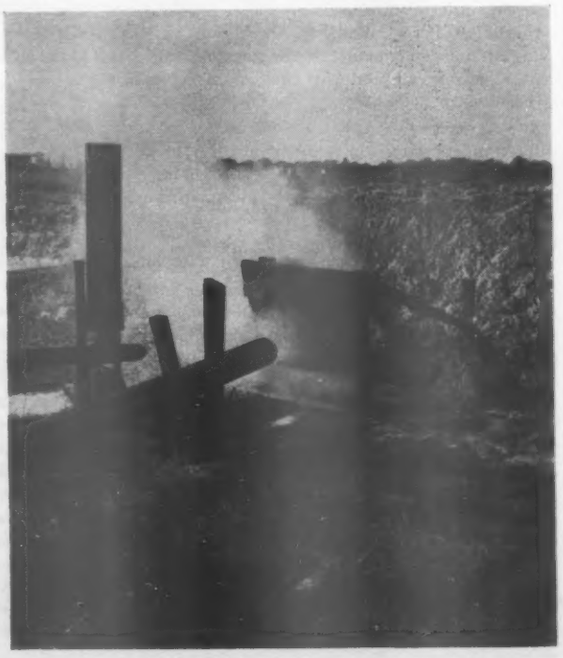


Flood Lights Used on Rigs

As another means of simplifying rigging-up operations, one of the more active independent oil companies on the Louisiana Gulf Coast has adopted flood-lighting on all its rotary rigs. The flood lamps require less stringing of wiring that conventional lighting systems, and with fewer units can be taken down or installed in less time. Also, more effective and general lighting is provided. The only conventional light globe on these rigs is over the instruments.

Buffer Eliminates Dike Erosion

Space limitations on a drilling location of one Texas Gulf Coast operator required the construction of the shale pit aboveground by means of a dike at a spot almost under the derrick itself, the impact of the exhaust steam from the engines and pumps was found to cause serious cutting of dikes. To overcome this, the exhaust line of the engines was equipped with a tee, bull-plugged on the run, with a nipple on the riser fitting into a section of much larger pipe, loosely set over the nipple, to serve as exhaust stack. The pump exhaust line, being larger, would have required a heavier stack, entailing a special foundation to support it. Instead, a baffle of 3-in. planks was set up a short distance from the end of the exhaust line, and braced to the dike to resist the impact of the steam. By setting the baffle at an angle, the exhaust impulse was absorbed gradually.



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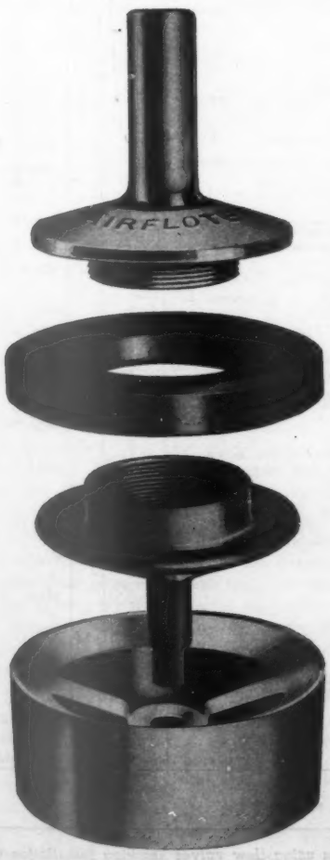
FIRST cost of a mud pump valve won't drain the average drilling budget by a long shot. But when you have to *keep on* buying and *keep on* replacing valves and seats, you soon have a sizeable maintenance bill on your hands!

That's why MacClatchie "Airflote" Valves fit into the picture so well right now . . . for the renewable parts features of these valves not only save your steel equipment needs but the Valve itself is made to give you *more* trouble-free months of pump operation as well . . .



EVERLASTING STEM CAP, now hardened, is practically indestructible and can be used over and over again. By simply adding a new body and insert to the stem cap, new valve performance is obtained.

REVERSIBLE INSERTS. New improved composition inserts made in MacClatchie's own factory give a positive fluid seal at highest pressures. Thicker and thus longer wearing. Afford greater sealing surface and make both valve and seat last longer. When worn, they can be reversed to give you *double* wear, *double* economy.

REPLACEABLE VALVE BODY is heat-treated to give long life under hard usage. The valve body absorbs the impact *over its entire surface* and is economically replaced when worn. The MacClatchie valve body constitutes only half of the valve —the other half being the everlasting stem cap. Consequently, MacClatchie bodies cost only about half that of other makes.

LONGER LASTING SEATS. "Airflote" Valve Seats have 50% to 100% *more* striking surface than others, absorbing the valve blow over their entire circumference and practically all of the patented built-in cross bar. The larger striking surface of the cross bar keeps the valve from pounding down into the seat. Yet seats have ample open area to permit smooth fluid passage and prevent sanding up.

SMOOTHER PUMP PERFORMANCE. You can't expect a heavy, sluggish valve to lift fast and respond instantly to pressure changes . . . or give the silky-smooth pump performance you want to reduce equipment wear and expense. *The "Airflote" has a fluid-tight air chamber that greatly increases its buoyancy, without sacrificing strength or rigidity.* It lightens the valve action so that the valve responds instantly to changes in flow and gives *far less impact* at each reversal of the pump stroke. In addition, this feature reduces valve seat erosion and insures longer valve and seat life.

These important MacClatchie "Airflote" Valve advancements will cut operating and maintenance costs on *all* your pumping jobs . . . and insure smoother, longer mud pump performance as well. "Airflotes" are made in 65 sizes and types for all pump installations. Write MacClatchie today for details—or order a set direct from your supply store!

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Basic Principles of Closed Type Flow-Valve Installations

By JAMES E. HALFERTY
Petroleum Engineer

Mr. Halferty discussed open-type installations in a previous article, "Practical Application of Flow-Valve Installation Principles," which appeared in the November 27, 1941, issue of The Oil and Gas Journal. The present article brings up the application and operation of closed-type flow-valve systems which are particularly adapted to wells having a low productivity index, low bottom-hole pressure, or those having intermittent injection equipment.

A short biography of the author appears in Journalisms on Page 96 of the current issue.

IN a recent article* the basic principles governing spacing, submergence, and other fundamental considerations of an open-type flow-valve installation were outlined. It is the purpose of this article to supplement those propositions with a summary of the flow-valve-installation principles as applied to closed installations, and to compare the two types of installations.

Open Installation

To review briefly, an open-type flow-valve installation is one where gas-lift flow devices are run on the well tubing, with no packer, standing valve, or other lower restriction between the casing and tubing, and no restriction between the casing and/or the tubing and the formation.

The most important considerations with which the engineer must concern himself in designing a correct flow-valve installation—after the selection of the type of valve—are (1) the submergence of the top flow valve below the maximum static fluid level, and (2) the maximum spacing between flow valves.

Condensed to formula form, and also including a numerical example, the following apply to open installations for the differentially operated, spring loaded (nonvelocity closed) flow valve:

1. *Submergence*:

$$S = \frac{C - V}{w} = \frac{400 - 125}{0.33} = 834 \text{ ft.}$$

Where:

S = submergence of the top flow valve in an open installation below the maximum static fluid level (in feet).
C = casing pressure = 400 lb. per sq. in.
V = differential reopening pressure of the flow valve = 125 lb. per sq. in.
w = maximum static fluid gradient = 0.33 lb. per sq. in per ft.

Note: At exceptionally high pressures an excessive submergence often results since the volume for which the flow valve is set under normal conditions might result in an insufficient starting velocity necessary to move the load which is required to reopen the valve at high casing pressures. Where this condition is anticipated, the top valve should have its volume passage increased to the amount necessary to give the proper starting velocity—between 10 and 20 ft. per second.

2. *Spacing*:

$$D = \frac{V}{w} = \frac{125}{0.33} = 378 \text{ ft.}$$

Where:

D = maximum spacing between flow valves (in feet).

It is usually wise to deduct 10 per cent from the calculated figure to allow for future loss of valve-spring tension and then select the nearest full tubing length combination. In the example this would be 378 × 0.9 or 340. The nearest 31 ft. tubing length combination is 31 × 11 or 341 ft.

It is here emphasized again that the spacing of this type flow valve is not dependent on the casing pressure.

*"Practical Application of Flow Valve Installation Principles," Nov. 27, 1941, The Oil and Gas Journal.

A very natural question which might arise at this point in the discussion is, "What effect has the ratio of casing annulus area to internal tubing area (hence the effect of fluid transfer from the casing annulus into the tubing), on the submergence and spacing of flow valves?"

In an open installation, the ratio of annulus to tubing area does not enter into the problem since the fluid in the casing annulus is forced back into the formation by the amount of applied casing pressure, rather than transferred into the tubing. The effect of fluid transfer in a closed installation is discussed below.

Closed Installation

A closed flow-valve installation (see Fig. 1) differs from an open type in that the casing is packed off from the tubing above the producing formation, and further, the reverse flow from the tubing to the formation is prevented by a standing valve. This system is particularly adaptable to wells of low productivity indices (regardless of bottom-hole pressure) and especially to wells of low bottom-hole pressure. This type of flow-valve installation is also very desirable for unloading wells equipped with intermitter depletion systems where it is most essential that the applied casing pressure to be kept off of the producing formation.

In a closed installation, where a packer and standing valve are run and the well fluid cannot be forced back into the formation once it has entered the tubing, the submergence of the top flow valve below the static fluid level must take into account the ratio of annulus area to tubing area. The determination of the submergence of the top valve in a closed installation is given by the following relationship:

$$S' = \frac{C - V}{w\,(R + 1)} = \frac{400 - 125}{0.33\,(4.6 + 1)} = 149 \text{ ft.}$$

S' = Submergence of the top flow valve in a closed installation below the maximum static fluid level (in feet).
C = casing pressure = 400 lb. per sq. in.
V = differential reopening pressure of flow valve = 125 lb. per sq. in.
w = static fluid gradient = 0.33 lb. per sq. in. per ft.

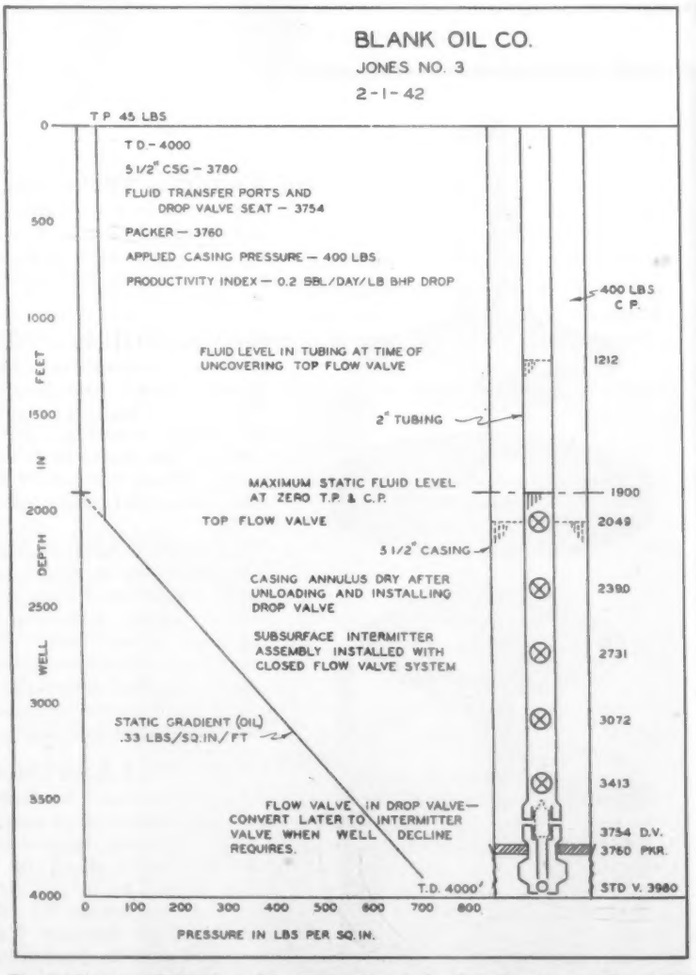

Fig. 1—Diagram of closed gas-lift system using flow valves showing installation and operating principles

R = ratio of annulus area to tubing area = 4.6 for 5½-in. casing annulus to 2½-in. tubing area.

It can be seen, therefore, that the effect of fluid transfer in a closed installation reduces the submergence of the top valve considerably over an open-type submergence—149 ft. compard to 834 ft. in the example used.

Fluid Transfer Illustrated

The spacing of flow valves in a closed installation is governed by exactly the same principle as an open installation, i.e., the differential reopening pressure of the valve, and the maximum static fluid gradient. The ratio of casing annulus area to tubing area (fluid transfer) has no effect on the spacing of differential pressure reopening, spring loaded flow valves. To illustrate this point, the following example might prove helpful:

Consider the conditions as shown in Fig. 2. The flow valves are spaced property at (125/.44) × 0.9 = 256 ft. or a practical spacing of 248 ft. (eight tubing singles). A packer, open fluid transfer ports from the casing to the tubing immediately above the packer, and a standing valve on the tubing below the packer are included.

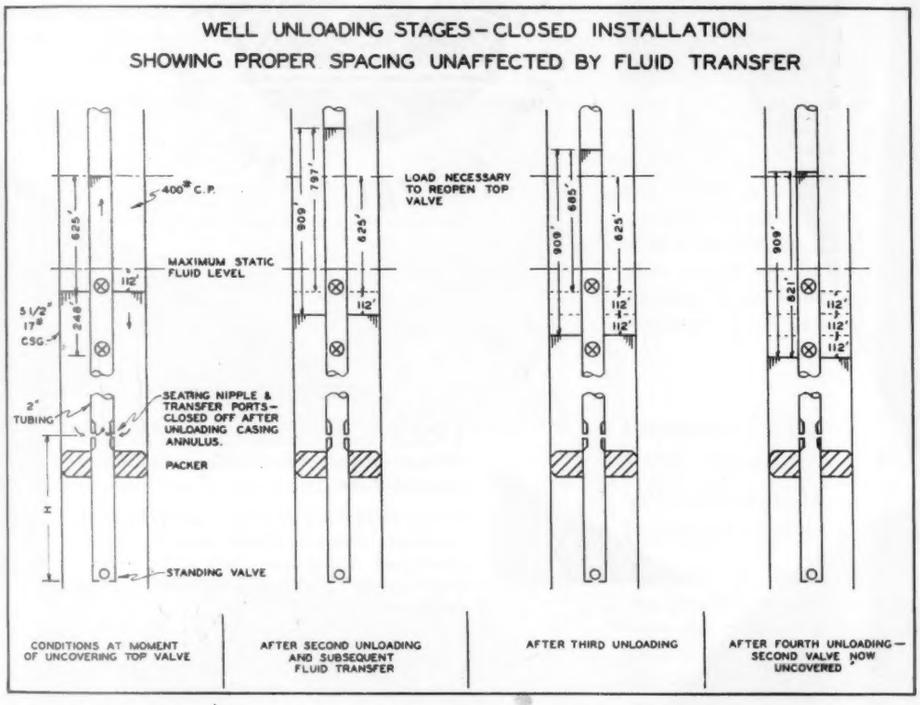
WELL UNLOADING STAGES – CLOSED INSTALLATION
SHOWING PROPER SPACING UNAFFECTED BY FLUID TRANSFER
400# C.P.
MAXIMUM STATIC FLUID LEVEL
5 1/2" 17# CSG.
2" TUBING
SEATING NIPPLE & TRANSFER PORTS – CLOSED OFF AFTER UNLOADING CASING ANNULUS.
PACKER
STANDING VALVE
LOAD NECESSARY TO REOPEN TOP VALVE
CONDITIONS AT MOMENT OF UNCOVERING TOP VALVE
AFTER SECOND UNLOADING AND SUBSEQUENT FLUID TRANSFER
AFTER THIRD UNLOADING
AFTER FOURTH UNLOADING — SECOND VALVE NOW UNCOVERED

Fig. 2—Spacing of flow valves is shown to be dependent on the differential reopening pressure and the maximum static fluid gradient

In the above well, the submergence of the top valve below the maximum static fluid level is (400-125) / 0.44 (4.6+1), or 112 ft. When 400-lb. casing pressure is applied, fluid transfer uncovers the top valve, which opens due to the 275-lb. fluid load above it at the time it is uncovered. This unloading process momentarily relieves the pressure in the tubing by 275 lb. and further fluid transfer takes place, against lowering the fluid level in the casing by an additional 112 ft.

This second casing working fluid level is now 112 ft. below the top valve. Since 400-lb. casing pressure supports a fluid column in the tubing of 400/0.44 or 909 ft., this now leaves 900—112 or 797 ft. of fluid still above the top valve or ample to reopen it since only (400—125)/0.44 or 625 ft. is all that is necessary.

The top valve therefore again reopens and relieves the internal tubing pressure by 275 ft., resulting in a fluid transfer again and another drop of 112 ft. in the casing fluid level. This third drop leaves 797—112 or 685 ft. of fluid above the top valve, still enough to reopen it. After the fourth reopening of the top valve, the fluid drops an additional 112 ft. in the casing, making a total of 112+112+112 or 336 ft., uncovering the second valve. This same procedure follows right on down until the casing annulus is entirely unloaded.

If the ratio of annulus area to tubing area were greater, the drop per valve reopening would be less, but the unloading phenomena as outlined above would remain the same.

The above analysis assumes that no new well fluid comes in during the unloading process. Actually this is not true since the standing valve will open and emit well fluid into the tubing as soon as the internal tubing pressure has been lowered by an amount greater than the static fluid head H between the fluid transfer ports and the standing valve. However, due to this difference of head, the fluid transferring out of the annulus will always have that much advantage over the fluid coming in from the well. This means a series of changing conditions of momentary equilibrium as declining bottom-hole operating pressure balances declining fluid weight in the casing, with the fluid weight in the casing overcoming the declining bottom-hole operating pressure each time, due to the static head between the transfer ports and the standing valve.

Therefore, even though some well fluid is produced along with the fluid transferred out of the casing annulus, the relationship of spacing to annulus—tubing ratio remains as shown above.

Casing Annulus Unloading

To the above discussion it might be added that in unloading an open-type installation (no packer or standing valve), it is only necessary that the well unload faster than the bottom-hole input rate of the well, i.e., that the input rate of the well is less than the capacity of the size tubing used; and that the applied casing pressure have sufficient energy (approximately 100 lb. per 1,000 ft. of depth) to dig down and "go around bottom." The working fluid level in the casing is maintained therefore by balancing casing pressure with fluid input rate (productivity index).

To unload a closed installation initially, it is best to have a port arrangement between the fluid in the annulus after the packer is set. The ports should be so adapted that they can be closed after the initial unloading operation is completed.

Where the closed-flow-valve installation is run above bottom-hole intermitter equipment, the working valve of which is removable, the problem is greatly simplified, in that the well can be unloaded through the intermitter valve seat ports, after which the intermitter valve is run on a wire line and seated, sealing off the transfer ports (see Fig. 1). Or, a regular flow valve can be installed in the removable valve, which serves the double purpose of sealing off the fluid transfer ports, and having an operating flow valve just above the packer. Where accessible transfer ports are not run above the packer, the well must be unloaded before the packer is set. This, of course, is usually inconvenient unless the proper type pressure stripping-head equipment is used in running tubing.

Another important consideration in making a successful closed installation, is to use a flow valve with a nonreturn or check valve feature built into the gas port in such a manner that well fluid cannot pass back through the flow valve and refill the annulus during a shut-in period. Once the annulus is unloaded, it is important to keep it "dry," not only to prevent unnecessary unloading and fluid-transfer operations, but also to reduce the possibility of casing corrosion from salt or sulfur wet well fluids.

The packer in a closed installation should never be set below old casing or liner perforations that have been squeezed off, or any other possible source of leak which might gradually fill the casing annulus with fluid and hinder proper operation. Double packer settings are frequently employed in excluding and sealing off an undesirable wet zone or leak.

Installation Type Selection

A question which frequently confronts the operator contemplating a flow-valve installation, is whether to run an open or a closed type. No set of rules can be laid down which will govern every well, but in general the following are the important factors affecting the selection of the type of installation:

Open-type installation.

1. Usually run in wells with an appreciable bottom-hole pressure (high static fluid level), after the well quits natural flow. Frequently very little additional energy is necessary to kick the well off, and the addition of as few as three or four flow valves will often carry certain types of wells for a long period through this intermediate producing stage.

2. Run in high fluid level wells where prorated production is desired. Since in an open-type installation the seal between the casing and tubing is the variable working fluid level rather than a packer, this fluid level can be changed by raising or lowering the applied casing pressure, which in turn means varying the producing depth and consequently the daily production. Here a few automatic intermitting flow valves can take the place of a long string of macaroni inner tubing plus surface-controlled intermitter equipment, where the latter type gas-lift system is used. This naturally results in an appreciable monetary saving, and, what is more important at present, a conservation of the now scarce, small-size tubing.

3. Open-type installations are particularly applicable for unloading and "bringing in" new wells after the drilling mud has been displaced with

(Continued on Page 50)

THIRTY YEARS OF SERVICE

30th ANNIVERSARY
CONTINENTAL SUPPLY CO.
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Refinery IDEAS

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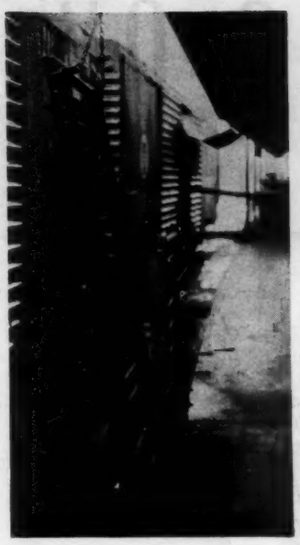
Lunch-Time Convenience

Boards which slide in or out of the bench seat provide individual tables for workmen in this refinery. The workman sits on the bench with his legs astraddle the board

on which he places his lunch box. This makes it possible to accommodate a larger number of men in the same room than if a regular table was used.

Electric Motor Drives Pipe Threader

A unique but highly efficient method of pipe threading is carried on in this refinery. The threading machine is driven by an electric motor through an automobile transmission and a 3-ft. drive shaft. The transmission is mounted above the motor in the pyramid frame shown at the right. The motor is connected with the transmission by a double reduction chain drive. The drive shaft, from the transmission to the threading machine, disconnected from both when not in use, is equipped with universal joints on either end. Pipe from 2 to 4 in. in diameter is threaded in this manner, third gear being employed in threading smaller diameter pipe and first gear for the larger pipe so as to reduce whipping in the drive shaft.

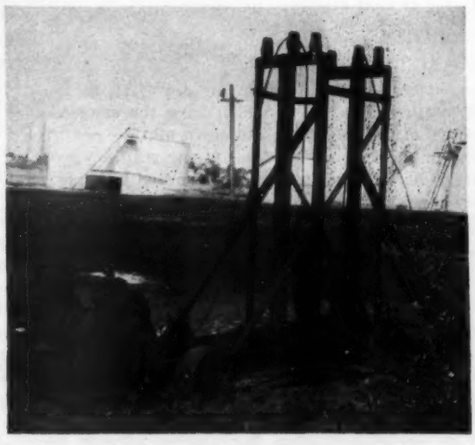


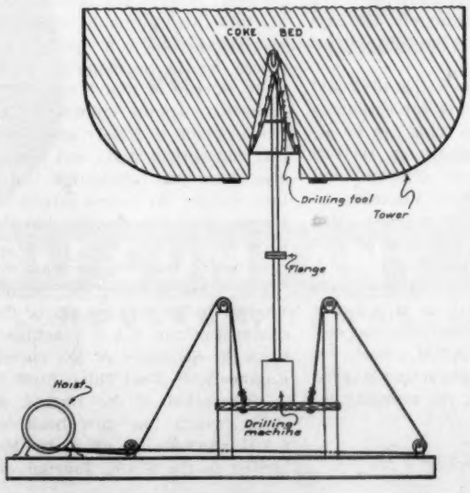
Suspended Conveyer System For Handling Canned Oils

This device is used to facilitate the loading of box cars with canned oil in cartons. Branch roller-type conveyors lead from the main conveyor running the length of the platform to the railroad cars. They are placed so that several cars can be loaded simultaneously. The section of the branch conveyor spanning the space between the platform and the car is raised or lowered by a cable running through pulleys to a crank on the wall of the package house. The crank for operating the pulley is located just to the right of the doorway in the above picture. The other section can be raised by hand when not in use and the two sections are then hooked together as shown in the closeup. This provides a clear passageway for people using the platform.

Remove Coke From Tower With Movable Boring Machine

Removal of coke from the bottom of a tower may be a difficult job. One refinery mounts an air-powered drilling machine in this hoist for cleaning it out. The drilling machine is set in the elevator which is raised or lowered by the air hoist at the left. A "drilling bit" consisting of a knocker ahead of a three-bladed knife is used to start the drilling. That bit is then replaced with another. The latter consists of a knocker ahead of four spiral, toothed blades which expand to a diameter of 20 in. Flanged sections of pipe can be added behind the bit to permit drilling to whatever depth is necessary. The assembly is mounted so it may be used under several coke chambers.





QUESTIONS ON TECHNOLOGY

By W. L. NELSON, Technical Editor

Viscosity Index of High-Viscosity Oils

What would be the viscosity index of a lubricating-oil stock which has a Saybolt Universal viscosity at 210° F. of 372 seconds and a Saybolt Universal viscosity at 150° of 1,865 seconds?—L. M. J.

Before answering the question it should be stated that the viscosity index of such a stock would not be of much practical significance because such a material is seldom used in the pure state. Such a stock is usually blended with other less viscous stocks—and the index of the mixture is not the arithmetic average of the indexes of the two stocks that are blended.

Very viscous oils such as the one considered here are such an extreme case that their indexes cannot be read from the regular charts or tabulations of viscosity index. The index can, however, be computed from the original method of Dean and Davis or more easily from information given in Petroleum Products and Lubricants of the A.S.T.M. (Designation D567-41), 260 Broad Street, Philadelphia, Pa.

The viscosity index is expressed mathematically for any oil as:

$$V.I. = \frac{L - u}{L - H} \times 100$$

in which L, H, and u are the viscosities at 100° F. of three oils, all of which have the same viscosity at 210° F. as the unknown oil. The u oil is the unknown one, the L oil is one with a viscosity index of 0, and the H oil is one with a viscosity index of 100.

For the special case of very viscous oils the equation may be expressed as follows:

$$V.I. = \frac{0.216Y^2 + 12.07Y - 721.2 - u}{0.1752Y^2 - 0.498Y - 245.8}$$

in which Y is the viscosity of the unknown oil at 210° F. in Saybolt Universal seconds and the u is the same as above, or the viscosity at 100° F. of the unknown oil in Saybolt Universal seconds. Note particularly that this applies only to the very heavy oils such as ones which are more viscous that 75 centistokes (approximately 350 Saybolt Universal at 210° F. or 30,000 Saybolt Universal at 100° F.).

If viscosity data are not known for 100° and 210° F., it is necessary to compute (or estimate) viscosities at these temperatures. This can be accomplished by A.S.T.M. Designations D341-39 (Standard Viscosity-Temperature Charts) and D446-39 (Conversion of Kinematic Viscosity to Saybolt Universal Viscosity). These have also been discussed on this page in the issue of The Oil and Gas Journal of July 31, 1941.

For your particular oil, the Y in the above equation has a value of 372 (S.U. at 210) and a value for u of about 13,300 Saybolt Universal seconds was obtained from the A.S.T.M. charts by the construction of a line through your viscosity of 1,865 seconds at 150° F. Thus, the viscosity index is:

$$V.I. = \frac{20{,}360}{23{,}813} = 85.3$$

This does not check very closely with certain charts that are available (Universal Oil Products Co., Laboratory Test Methods, Chicago, Ill., Method No. k-69-40) but at the present time the A.S T.M. method as outlined here would appear to be most dependable.

Extreme Pressure Lubricant Testing

What is the standard machine in the United States for testing extreme pressure lubricants or what machine is most widely used? What companies are authorized to manufacture this machine?—T. Y. J.

The situation with regard to the testing of lubricants by standard testing machines is not satisfactory. Difficulty in checking results has at times been troublesome and in nearly all instances the results obtained with the machines have differed from the results of actual service. Finally, in a few cases, results that were definitely misleading have been obtained. All of these factors have been a great deterrent to study and the reaction of most research workers and manufacturers has been to try to test the lubricant and the actual machine part in the laboratory under controlled conditions of test that simulate actual performance. Many tests on the machine part in question have been conducted by isolating this machine part for the laboratory study, whereas in others the entire machine has been operated in the laboratory.

No statistics on the different kinds of machines that are now in use are available, but most men feel that the S.A.E. machine probably is used most widely, although the Timken machine may be used by an almost equal number of operators. Since about 1937, over 50 S.A.E. machines have been sold, but recent defense activities have slowed the rate of production and increased the cost to something over $750. Among the numerous machines that have been used extensively enough to become known by a particular name are the S.A.E., Timken, Almen, Floyd, Weeks, and General Motors machines. In 1934 the Timken machine was probably dominant and an effort was made to adopt a standard machine based primarily on the development of a machine by the U. S. Bureau of Standards. This effort to find a standard machine culminated in the S.A.E. machine, which is widely used today. Nevertheless, this widespread study and investigation served to also show that lubrication testing in the laboratory was by no means satisfactory nor complete. Hence, most laboratories have continued to use such machines as they already possess, or have resorted to tests of the actual machine part.

The Timken tester can be obtained from the Timken Roller Bearing Co. of Canton, Ohio; data concerning the S.A.E. machine can be obtained from the Secretary of the Society of Automotive Engineers, 29 West Thirty-ninth Street, New York. A description of the Bureau of Standards machine, which has now been modified into the S.A.E. machine, is given by McKee, Bitner and McKee in the S.A.E. Journal of December 1933, Page 402. The S.A.E. machine has been manufactured in the past by the Highway Trailer Co., Edgerton, Wis.

Aromatics Produced From Petroleum Residues

We have heard rumors about the production of benzol from fuel oil by some of the gas-manufacturing companies. Can you tell us anything of this?—R. C. G.

The main source of benzene, toluene, etc., has in the past been the gas industry. These aromatic hydrocarbons are a byproduct of the high-temperature carbonization or cracking of coal in ovens. These hydrocarbons are found in the gas, and are removed by absorption, stripping, fractionation, and finally chemical treatment.

The same can be accomplished by the high-temperature cracking of petroleum residues such as fuel oil or asphalt but the process is not usually economical in connection with petroleum refineries because there is no ready market for the enormous amount of gas that is produced. Such operations are, however, economical if conducted in a gas plant in close proximity to the gas market, and in fact the Portland Gas & Coke Co., Portland, Ore., is now constructing a large plant ($1,250,000) which is to operate on 8.5 A.P.I. Dubbs cracked residuum. Knowles coke ovens are being employed but they are of a modified design which is aimed at a large production of gas rather than the production of gasoline and coke.

Oil gas has been manufactured for many years and more widely, gas has been enriched by means of oil, but in these processes the operation has been directed purely toward the manufacture of gas. In the Portland plant the process is directed toward gas manufacture but the process is also operated in such a way that the byproducts in the nature of liquid products are also sought. This company has studied (E. L. Hall, Aromatics, Gas and Coke From Heavy Petroleum Residues, Chem. & Met., September 1941, p. 100) three ways of making gas and aromatics from oil. These methods are (1) cracking oil at high temperatures in conventional gas generators; (2) cracking in alloy-steel tubes both with and without a catalyst, and (3) cracking in Knowles coke ovens. The last named method was chosen for the commercial plant because it has the advantages of the other processes and in addition it produces a coke that is suitable for the carbon-arc electrodes that are used extensively in that vicinity. Experimental data from a pilot Knowles coke-oven plant are as follows:

Feed, °A.P.I.	8.4
Feed, gal. per M.c.f. gas	17.8
Feed, lb. per M.c.f. gas	150.0
Gas, M.c.f.	1.0
B.t.u. per cu. ft., gross	1,038
Specific gravity	0.64
Light oil, 422 E.P., gal. per M.c.f.	2.15
Tar, gas per M.c.f.	6.08
Coke, lb. per M.c.f.	22.68
Gas composition, vol. per cent:	
Carbon dioxide	0.20
Carbon monoxide	1.54
Oxygen	0.58
Hydrogen	22.74
Methane	43.59
Nitrogen	4.46
Ethylene	10.44
Ethane	7.20
Propane	6.00
Butenes	2.08
Pentenes	0.63
Hexenes	0.54

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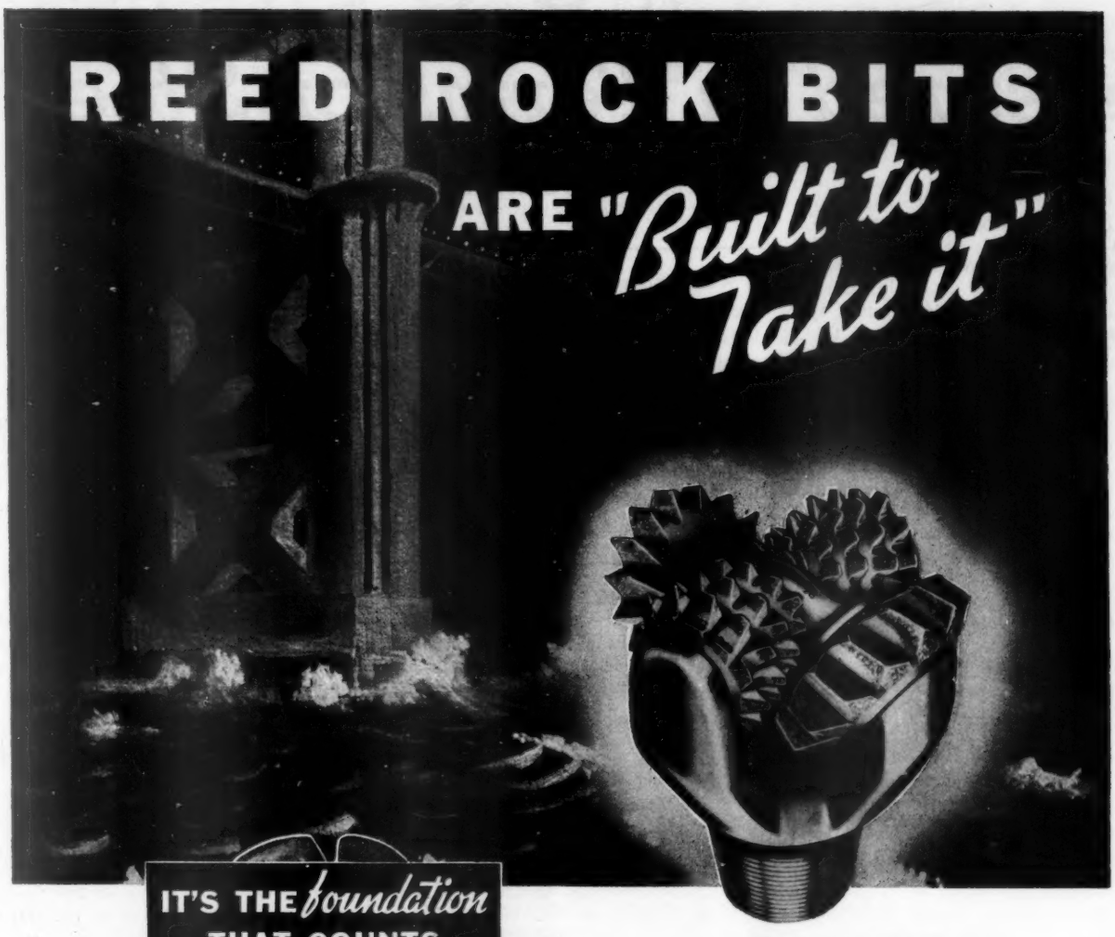

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Cost of Increased Production Measured in Terms of Steel

By LYNN C. CONVERSE
Consulting Flood Engineer

War economy demands that the first consideration given to new production is its cost in steel. A comparison of new primary oil and new secondary oil in terms of essential steel shows a large steel economy in favor of secondary recovery. Converting nearly depleted pools from primary to secondary recovery releases large quantities of steel at the same time increasing production.

SINCE Pearl Harbor the entire concept of the production of crude petroleum has changed from the cost in dollars to the cost in steel. There can be no doubt in anyone's mind today that the entire nation is called upon for an all-out effort. Our limitation in turning out the implements of war is not in dollars or man power but in the amount of steel available for war uses.

To implement the war machine we must have an unlimited supply of petroleum products. It goes without saying that we can produce sufficient crude for the war effort alone with no more steel than that required for maintenance of the present producing wells. But the extent to which the oil industry can supply both the war effort and the civilian demand depends upon how fast the industry can change from the old economic concept of dollar economy to the necessary wartime economy of producing the greatest amount of crude with the least expenditure of steel.

Tire and automobile rationing will reduce the domestic demand for petroleum products but it is quite probable that the increasing war demand will more than take up this slack. It is apparent then that we must develop new pools and extend known pools to maintain the present production against the normal decline. The cost in steel for new production is a definite known quantity so that the amount of new production which may be developed is limited by the amount of steel allocated for this purpose. Exclusive of the steel used for discovery each 1,000 lb. of steel allocated for new production will cover the needs of 1 bbl. of new sustained daily production.

To supplement new production there are other sources from which we can increase our daily production during the emergency with much less expenditure of steel. An analysis of steel costs for some of the types of production in the Mid-Continent show some startling results.

Using the OPC estimate of 210,000 lb. of steel per well for 1942, 40-acre spacing and 200 bbl. per day withdrawal for 1,000 days the cost in steel is 1,050 lb. for each barrel per day of sustained production or 1.05 lb. per barrel of total production for 1,000 days. This compares with the minimum steel requirements for the average 1940 drilling depth of 3,014 ft. when we used 20-acre spacing and 100 bbl. per day withdrawal. As a measuring rod and for comparison we can use the unit for new production of 1 lb. of steel per total yield or 1,000 lb. of steel per barrel of daily production.

Cemented Tubing to Pay

Gas or air repressuring may be anything from a regular geometrical pattern with every alternate well an input well to two or three gas-input wells to the 160 acres. In any case, it is presupposed that the recovery wells are already in and equipped. Although small-diameter casing has frequently been used in the past, a string of tubing cemented into the top of the sand is all that is required for gas or air-injection wells. While the recovery per acre is much less than with water flooding the increase in production per pound of steel required is definitely much less than primary production. Results of gas repressuring at Glen Pool for instance where new input wells were drilled indicate a return of 1 bbl. of production per 0.2 lb. of S.H. steel or one-fifth the steel requirement for new primary production. Where old wells are converted into injection wells there may be a net gain in steel where tubing is substituted for casing in the injection wells.

Secondary-recovery production by water flooding may be obtained all the way from 0.5 lb of steel per barrel of crude to a net gain of 1.9 lb. of steel per barrel of gross production; both examples of which are illustrated. It is assumed that research has proven 5,000 bbl. per acre recoverable before any expenditure for steel is made under all conditions. The heaviest steel expenditure would be in the so-called shallow areas (500 to 1,000 ft.) where all wells would have to be drilled.

Three hundred and thirty-foot spacing 500 ft. deep or 440-ft. spacing 1,000 ft. deep would each require approximately 2,500 lb. of S.H. tubing and line pipe per acre or 1,500 lb. of new smaller diameter tubing and pipe as a minimum requirement for flowing conditions. Under flowing conditions, only a drilling string of casing would be used which is pulled when the tubing string is cemented in place.

Illustrating the other extreme is a pool now under study for water flooding. The producing horizon is at 3,000 ft. with wells drilled on a clean 10-acre pattern. Approximately 600 acres are inside the 30-ft. contour, producing a little less than 10 bbl. per well per day. Under existing conditions the pool is expected to produce 400,000 bbl. before reaching the economic limit. With water-flood conditions it is estimated to produce 7,000 bbl. per acre or a total of 4,200,000 bbl.

The sand and oil conditions are such that 660-ft. spacings from water to oil can be used for that depth which means that every other well can be corrected and converted into a water-input well. If it is decided to pump the oil wells the casing from the 30 input wells would be released after the tubing string is cemented in. Allowing 500,000 lb. for surface lines the 30 wells would release 2,000 tons of desirable casing or a net gain of 0.95 lb. of steel for each barrel of estimated flood production.

If (as expected) the sand resistance is less than 1.5 lb. per foot the wells can be flowed. In this instance the oil wells would also be equipped with a tubing string cemented in and an additional 2,000 tons of casing released after allowing 500,000 lb. for extra heavy tubing in the input wells. The result would be the release of 4,000 tons of steel essential for war uses plus the production of 3,800,000 bbl. of new production. This is not a hypothetical case but a pool now under economic study and is typical of the steel economy in many other pools in the depth range of 1,500 to 3,500 ft.

It is not the purpose of this article to deal with the many factors which enter into the economics of secondary recovery other than the economy of steel. It should be remembered, however, that under the conditions of reservoir temperature and pressure the viscosity of high-gravity Mid-Continent crude approaches that of water as depth increases.

With the viscosity of the driven fluid and the driving agent similar the oil moves much faster and farther than under the more familiar conditions in the shallow fields. For this reason the old original spacing is frequently satisfactory by converting each alternate well into an input well. Without the necessity for drilling, the development cost is very low making the economics of converting many of the old deeper pools sound without the added incentive of releasing much needed casing for new production.

Requires Little Steel

Since input wells only require a tubing string cemented into the sand section after the well is converted, casing from all input wells is released whether the pool is to be pumped or flowed. If flowing practice is used the recovery wells are later treated in the same manner and all casing pulled. With the flow lines and tankage in place the only steel required is the surface pressure line which in tonnage is much less than the salvaged casing, leaving a sizable credit in steel to the conversion project.

Returning to the 600-acre pool mentioned, the economic life of the pool will extend about 3 years under the present producing practice. It is significant to note that each barrel of present daily production is holding approximately 23,600 lb. of steel or 32.5 lb. per barrel of ultimate recovery. The last year before the economic limit each barrel of daily production will be holding 50,000 lb. of steel from more productive work.

Most significant is the fact that conversion of the pool to water flooding will release 8,000,000 lb. of steel and hold only 1.6 lb. of steel per barrel of total flood production.

In the past it has been customary to delay any secondary recovery until a pool has reached its economic limit on primary production. This has not always been sound economics. Now, in the light of steel economy imposed by the war it is necessary to reverse the order and consider how soon a pool can be converted to secondary recovery rather than how long it can be produced by primary methods. If the pool is a secondary-recovery possibility, all of the remaining primary oil will be produced with the secondary oil and the total increased production will be at a very small fraction of the steel required for either the old or new primary production.

In all honesty we must look at the cost in steel for stripper production, the much quoted back-

bone of the industry. It divides into two classes: that which supports company operating standards and overhead and those leases mostly operated by individuals and small companies with little or no overhead. Of the latter 1 bbl. of production holds from 80,000 to 160,000 lb. of steel, most of which classifies as scrap. If the war effort has to be sustained over a period of time we will soon approach the day when the carload of scrap, now used to produce 1 bbl. of oil, will be worth much more to the national economy than the oil.

With this thought in mind each stripper-well lease should be examined carefully for its secondary-recovery possibilities. Sufficient data have now been accumulated for the experts to eliminate the undesirable properties and lay out an orderly program for intelligent development of sound economic properties. It is the obligation of American patriotism for every operator to analyze all of his properties with a view to (1) produce additional oil with the minimum expenditure of steel, and (2) to release as much low-producing steel as possible for more productive uses. Where low-producing steel can be released and increased production secured at the same time there is a moral obligation which cannot easily be sidestepped.

BOOKS

PRACTICAL ARC WELDING. By W. J. Chaffee. Hobart Trade School, Inc., Troy, Ohio. 516 pp. $2.

Part 1 of this textbook is devoted to general welding information. Material covered includes the growth of arc welding; where arc welding is used; manufacturing applications; available metals and alloys; discussion of joints and welds; electrodes and filler rods; cost of arc welding; characteristics of the welding arc; welding symbols and their use; equipment for arc welding; development of welding personnel. Parts 2 and 3 are devoted to the complete series of arc welding lessons exactly as they are offered in the Hobart Trade School. Parts 4 and 5 contains a complete dictionary of welding terms and 20 pages of helpful tabular material for operators and designers. The handbook also has an 8-page crossreference index.

STRATIGRAPHIC TYPE OIL FIELDS. Edited by A. I. Levorsen. 900 pp.

"Stratigraphic Type Oil Fields" is a symposium of 37 papers prepared under the auspices of the American Association of Petroleum Geologists, dealing with American oil fields in which there is no structural closure on at least one side. These pools are about equally divided between single-pay and multipay fields and embrace a large variety of lenticular, shoestring or offshore bar sands and limestone reservoirs.

The book is of a caliber fully as high as previous publications of the association dealing with structural accumulations. With such a large number of pools described, nearly every type of stratigraphic trap is dealt with so that operators in any pool of this sort will find information on production from a comparable pool which will be of considerable assistance to them in their work.

"Stratigraphic Type Oil Fields" may be purchased through the Book Department of The Oil and Gas Journal at the established retail price of $5.50, postage prepaid (extra outside the United States), and a copy will be forwarded promptly upon receipt of check or money order for that sum. Where payment is not provided, the book will be sent c.o.d. to avoid delay.

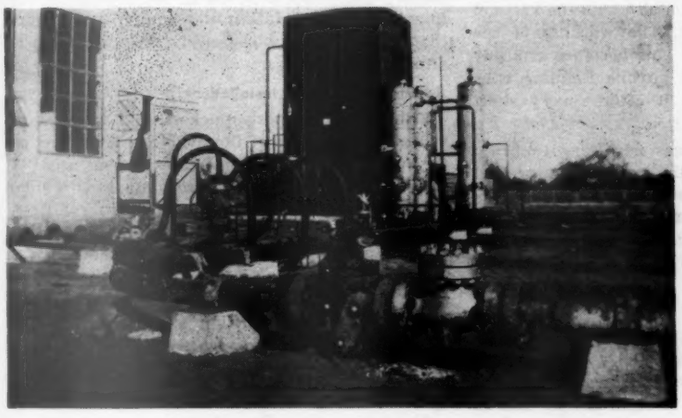
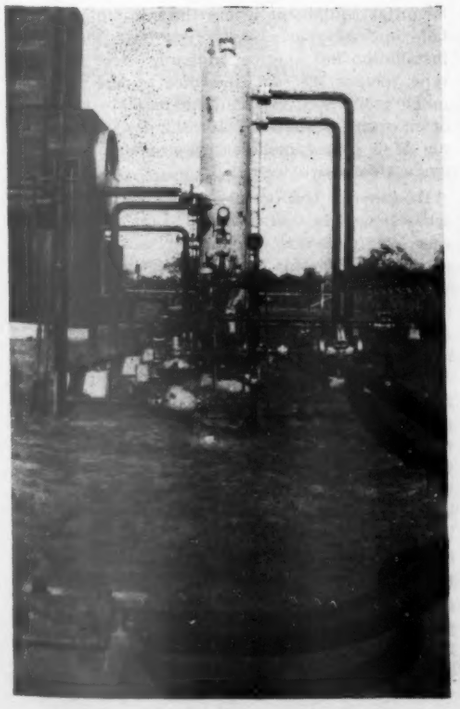


Fig. 1 (above); Fig. 2 (below)

Fig. 3



Rio Grande Recycling Plant Uses Nearly Mile of Arc-Welded Pipe

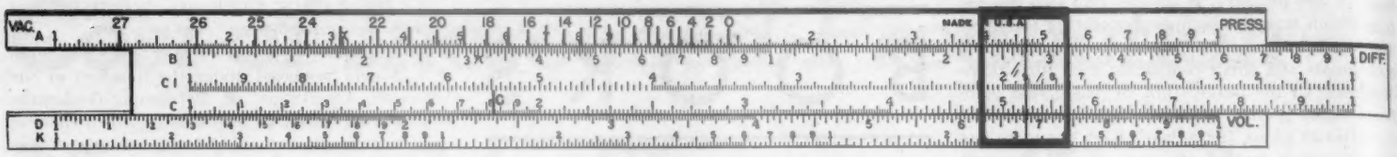
SOME idea of the amount of equipment needed and the work which goes into the construction of recycling plants is given by the accompanying photographs of construction of the Gulf States' new project in the San Salvador field, central Hidalgo County, Texas Rio Grande Valley. The construction of the lines and connections are all electric-arc welded.

Almost a mile of pipe was used in the gathering system which brings the gas from the wells to the plant. This line is composed of 5,000 ft. of 6-in. pipe with a wall thickness of ⅜ in. Each joint was welded in eight passes with a 5/32-in. electrode. The stovepipe method, in which each joint is individually welded, was selected for the job.

Pressures up to 4,000 lb. are used on the discharge lines. Fig. 1 shows a portion of the discharge piping from the plant. This has a wall thickness of ⅞ in. and each joint was welded with 10 passes with 5/32-in. Fleetwood shielded arc-type electrode. No rolling was employed, every joint being individually welded in position. In Fig. 2 the lines running into the high-pressure separators are shown. These separators operate at a pressure of 2,000 lb. per sq. in.

Connections and the method of construction of the injection-well heads are shown in Fig. 3. These connections must also operate under a pressure of 4,000 lb. per sq. in. The photograph shows bolted field connections which will permit changes or dismantling of the installation. The San Salvador project is intended for a pilot plant and changes to suit conditions are anticipated.

The gathering system, plant and injection system were designed and constructed entirely by the engineering staff of the Gulf States Recycling Co. If the operation of the pilot plant proves practical and profitable, it will be enlarged. While the size of the field, the ease with which the gas reenters the sand, and the richness of the gas are being determined, condensate recovery in the plant is being obtained by water cooling. This induces condensation and enables extraction of as much gasoline and distillate from the gas as possible.



Remodeled Slide Rule Speeds Gas-Volume Computation

THE calculation of volumes of gas or air produced along with the oil on a repressure project is a necessary but tedious job. In addition, it requires that the engineer visit each well at a specified interval, make the gage and compute the volume and make any adjustments necessary to maintain the desired volume.

If a junior engineer is available, he can be guided in this work and can make the necessary readings and adjustments and compile the records. Another method, used for isolated leases, or when no engineer is available, is to teach the pumper to operate the gaging equipment, to compute the volumes and make the necessary changes in the producing conditions. In his normal routine, the pumper visits each producing well several times a day and on one of the trips can perform this task.

Regardless of who does the work, any shortcut in the calculating of the volumes is welcome and if the pumper is to do it, the calculation must be simplified and some means provided which will make the work easy. John Hemphill, an engineer for Sinclair Oil Co. at Glenpool, Okla., has remodeled a slide rule so that his work and that of his assistant engineer has been reduced. This allows the engineers to spend time on other work which they could not do without this time saver. Men on other repressuring projects in the field are also using this method, in some cases the pumper doing the work of gaging and calculating. Their figures are later checked.

The slide rules used are the small inexpensive type, the main change being the addition of another scale which permits the vacuum reading to be used directly in the calculation. Also added to the rule is the identification of the scales for the corresponding factors in the calculations. The *A* scale on the rule is marked "Press" for pressure, the *B* scale is marked "Diff" for differential and the *D* scale is marked "Vol" for volume. The constant is marked on the *C* scale.

The formula for the calculation is

$$V = C\sqrt{P \times d}$$

V = volume in cu. ft. per day.
C = 1,820.
P = Pressure, lb. per sq. in. abs.
d = differential pressure per in. of Hg

The constant is based on the volume of the gas through the orifice on the meter setting in 24 hours.

Where pressures are being handled the calculation is simplified but where most of the readings at the well show a vacuum, additional steps would need to be introduced. The inches of vacuum must be multiplied by 0.491 (lb. per sq. in. per in. of Hg) and subtracted from 14.4 lb. per sq. in. barometric pressure in the field). This calculation is eliminated by the introduction of the additional scale.

The method used in measuring the pressure and differential on this particular project was discussed in The Oil and Gas Journal, August 28, 1941, Page 50. The pressure gage and manometer are combined in a single instrument which can be connected to the well in less than a minute.

After the pressure and the differential readings are obtained, it is only necessary to place the 1 on the *B* scale of the slide rule opposite the vacuum (or pressure), move the reading slide to the differential pressure observed and read the value of the radical in the equation on the *D* scale. The *C* scale is then moved so the unit mark comes under the reading guide and the volume in cubic feet per day can be read on the *D* scale under the constant mark.

To those accustomed to using a slide rule, the above is a simple calculation although the vacuum scale facilitates the work. The working of the problem with a remodeled rule becomes a purely mechanical operation and anyone familiar with simple arithmetic can do it after a very short period of instruction.

To determine the changes necessary to bring the gas production from the well to the desired volume, it is only necessary to reverse the procedure. The pressure remains the same and the volume can only be changed by altering the differential. The above equation can be changed so that

$$\sqrt{d} = V / C\sqrt{P}$$

For making this calculation, the constant mark on the *C* scale is set opposite the volume desired and the *B* scale and the reader glass is set opposite 1 on the *B* scale. The *B* scale is then moved until the unit mark on it is opposite the static pressure and the desired differential can then be read on the *B* scale under the reading glass. The well controls can then be changed and the desired differential established while the manometer is in place.

The additional scale can be laid off by placing the zero mark at the barometric reading of the particular locality on the *A* scale of the rule and then marking off at 0.491 intervals to the left. Each succeeding interval corresponds to an inch of mercury vacuum. Pressure appears on the *A* scale as it is only necessary to add the atmospheric pressure to the gage pressure to obtain the absolute pressure.

Basic Principles of Closed Type Flow-Valve Installations

(Continued from Page 41)

water or oil. In many areas swabbing in new wells is undesirable, and the open-type flow-valve installation furnishes a quick and clean alternative for this important function. Should the present shortage affect the supply of swab rubbers appreciably, the flow valve stands as a ready and competent substitute method of unloading oil wells. If automatic intermitting type flow valves are used for unloading, the well is then already equipped without the expense of an extra tubing job, to continue producing on gas lift when the natural flowing period is passed and artificial lift is needed.

Closed-type installation.

1. Usually the next stage in a depletion program after the bottom-hole pressure and productivity index have declined to the point where the desired production cannot be obtained with the applied casing pressure held against the producing formation.

2. Best suited for wells where the productivity index is so low (even though the maximum static fluid level may be high), that the desired production cannot be obtained before the well "blows around" bottom. This type of well is also adaptable to the semiclosed-type installation (packer but no tubing standing valve).

3. Most common application of the closed-type installation perhaps is the use of flow valves to unload a well above bottom-hole depletion intermitter equipment. It is highly desirable to install flow valves above intermitter equipment in order that the well will unload easily and automatically after shut-in periods.

Advantages of open installations.

This is the cheapest, quickest, and easiest type to run. A minimum of flow valves—depending on the producing depth desired—can be used. A packer and standing valve are unnecessary, since the tubing-casing seal is supplied by the well fluid, and the producing depth is controlled by the casing pressure and the depth of the bottom valve.

Deeper submergence of the top valve means fewer valves per installation than is permissible in a closed type. Unloading an open installation is greatly simplified since fluid transfer from casing to tubing is not a problem.

Advantages of closed installations.

Absolutely necessary where it is important to keep the applied casing pressure off of the producing formation, particularly above depletion intermitter equipment where the minimum bottom-hole operating pressure is required. The closed installation has another advantage over the open type, in that the seal furnished by the packer is much more positive than the variable fluid seal of an open installation. Also, the dry casing annulus of a closed installation protects the casing against corrosive well fluids.

In general, the open-type installation goes in when a well is first brought in, or when it first ceases natural flow due either to a loss of dissolved gas energy or to the influx of bottom water. In wells of slow reservoir pressure decline, or wells operating under restricted flow, a long and economical intermediate flow period can be maintained with an open-type flow-valve system.

After the well passes the open-type stage—and many wells due to their low bottom-hole pressure and low productivity index, can never be adapted at all to an open type—the closed installation is the next step in gas-lift depletion. Where the addition of the bottom-hole intermitter-depletion equipment is contemplated in the near future, it is usually wise to run the skeleon subpacker assembly along with the flow-valve installation (see Fig. 1). This is particularly true where the drop or removable type of intermitter valve is contemplated, since it is only necessary to drop in the intermitter valve when the well decline requires its addition to the system.

It should be pointed out that the principles of

spacing and submergence summarized herein, apply particularly to differential opening, spring loaded flow valves whose closing is dependent on pressure rather than velocity. The characteristics of velocity closing valves do not lend themselves to mathematical analysis as readily as do pressure closing valves, although in general, the same principles apply. Other phases of the principles of flow valve operation such as starting velocity, flowing friction, type of valve, etc., as covered in the original article, all apply to closed installations just the same as to the open type.

Casing Flow Valves

No discussion of flow-valve operation would be complete without at least a brief mention of casing flow valves.

This type of valve, as the name implies, is set to operate just the reverse of the conventional tubing flow valve. The valves are run on the tubing as usual, but the applied gas pressure enters the tubing, passes through the valves into the casing, and flows the well fluid out the casing annulus. This type of valve is especially adapted to handling large volumes of fluid, and in many instances far surpasses the fluid volumes attained by ordinary casing pumping methods. Unusually low gas-fluid ratios are common to this type of producing system, especially in high working fluid-level wells.

The important point to remember in designing a casing flow-valve installation is that the same principles governing submergence and spacing in a conventional tubing installation, also apply here. In other words, the casing flow-valve installation would be made in the same manner as an ordinary open-type installation, except that the surface connections would be reversed. Also, the bottom of the tubing is plugged just below the bottom valve.

The casing flow valve is always single-seated which means that all the valves below the working valve are in the open position. This permits the fluid in the tubing to transfer through the valves and into the casing during the unloading operation. The gas volume which a casing flow valve will pass is naturally more than that of a conventional tubing-type flow valve, since the fluid volume to be handled in the casing annulus per foot of depth is much greater than the fluid volume per foot of tubing depth.

Flow Valves in National Defense

The part played by the flow valve in the production of oil is assuming increasing importance in the present national emergency and all-out defense effort. Where an outside source of high-pressure gas or air is available—either natural or compressed—flow valves are able to produce the wells and thereby free for other purposes tons of steel and rubber necessary in conventional pumping and swabbing methods.

Abstracts of A.I.M.E. Papers

Delivered before the Petroleum Section, Feb. 9-12, New York City

An Engineering Study of the Magnolia Field, Arkansas

By H. F. WINHAM
Shell Oil Co., Inc.

THE Magnolia field was discovered in May 1938, when the Kerlyn Oil Co. 1 Barnett encountered showings at 7,647-52 ft. and at 7,664-69 ft. in the oolitic lime. It was completed as a 298-bbl. well through a ¼-in. choke. In June 1939, wells to the east, south, and west directions found the Smackover lime higher and proved the field to be larger than expected. As of December 31, 1941, there were 116 wells and 17 operators.

Arkansas Oil and Gas Commission required three casing strings; surface, 100 ft., intermediate, set in hard chalk, 2,200 ft., and producing string. Majority of wells were cored from the top of the producing formation to the bottom. Wells were completed both by cementing casing through gas-oil contact with open hole below or by drilling to total depth, setting casing on bottom and gun perforating. Each well was tested for gas-oil ratio and those exceeding 2,000 cu. ft. per barrel were penalized.

The coring determined the location of impervious streaks sufficient to prevent vertical migration in the gas cap and oil column. In some wells perforating intervals were selected so that each streak of permeability would be open to produce. If thin, the streak was entirely perforated. If thick, the upper 10 ft. would be perforated and unperforated pipe set in the impervious streak. This was to drain lowermost layers first and as water encroached, this streak would be plugged and production continued from the next level.

All production is from the Smackover lime, a dolomitic shale, oolitic lime and crystalline lime. The porous, permeable zone (sometimes known as the Reynolds lime) may be found as much as 60 ft. below base of dolomitic shale. Production is from this zone, the greatest thickness of which is 340 ft. Crystalline lime below this has given no evidence of production.

Structure is an anticlinal fold, elongated east-west. The areal extent of the field is 4,494 acres. Characteristics of the producing horizon are: Porosity, 18.5 per cent; permeability, 1,500 millidarcies (0 to 16,000); connate water, 20 per cent.

The oil varies from 38° to 41° A.P.I. gravity, and averages slightly above 39°. The salt content of from 30 or 40 lb. to 400 lb. per 1,000 bbl. was troublesome until the installation of desalting equipment. The gas has a gasoline and butane content of 3.1 gal. per 1,000 cu. ft. A shrinkage factor of 34 per cent has been determined.

Proration allowables are based on one-half of each well's share of the sum of bottom-hole pressures and one-half of each well's share of the sum of producing acreage. In December 1941, the allowable was down to 175 bbl. per well.

The original bottom-hole pressure was 3,465 lb. at 7,100 ft. and it had declined to 3,129 lb. in December 1941. The cumulative production then was 18,377,000 bbl. making the recovery 54,694 bbl. per pound of pressure. Records indicate productivity rose to 65,000 bbl. per pound from February 20, 1941, to July 15. The original gas-oil ratio was 700 ft./bbl., increased to 1,150 in January 1939, and since has fluctuated from 850 to 950 with its present rate 889.

Six pipe lines serve the field. All gas is processed in central plant of 20,000,000 cu. ft. per day capacity; production is 17,000,000 cu. ft. daily. The plant is a high-pressure absorption type operating at 200 lb. per sq. in., producing 30,000 gal. of gasoline and 22,000 gal. of butane per day.

Cost of drilling the first wells with large casing was from $75,000 to $80,000 which was later reduced to $65,000 while wells with the smaller casing averaged $55,000. Payouts in 1 to 1½ years are possible.

The original reserves were estimated at 180,000,000 bbl. with an estimated recovery per acre foot of 455 bbl. This has been raised to 555 bbl. and the total reserves to 220,000,000 bbl. with 90 per cent of production yet to be obtained. Sixteen wells now produce salt water from 3 to 760 bbl. per day, the total of 2,392 bbl. being disposed of in a surface pit. It is reasonable to believe that the flowing life of the field will be from 10 to 15 years and that the productive life of some wells will be 25 to 30 years or longer.

Caliper Logging

By C. P. PARSONS
Vice President, Halliburton Oil Well Cementing Co., Duncan, Okla.

CALIPER logging measures the variations in diameter of the open hole in a well. Being a direct physical measurement, the variations in the stratigraphic profile have considerable value for subsurface interpretations by the geologist, engineer, driller and others charged with the responsibility of properly completing and repairing oil and gas wells. Before the introduction of caliper logging there was considerable guesswork about the "landing field" for the cement in the bottom of a well.

The volumetric capacity of the portion of a well to be cemented was always an unknown factor. Groping in the dark has been a weakness in oil-well cementing, in formation testing or any other practice embodying the setting of packers in open hole. The calipers described herein eliminates those weaknesses by measuring the actual variations in diameter of the open hole in a well.

The caliper is run into a well in closed position. When it is desired to start logging, the four arms are released. These arms are independent of each other. As the calipers are pulled upward through the open hole, the arms are like nimble fingers feeling the changing profile of the hole. This mechanical action is in turn converted into an electrical circuit which is connected to a recording mechanism at the surface. The recording is directly in inches.

A caliper log can be embodied in a composite log for correlating it with the values shown in electrical and temperature logs. According to the size of the bit used to drill the hole in one well calipered, it would require 525 sacks of cement to fill the desired height behind the casing, but according to actual caliper measurement, it would require 1,650 sacks. The well was cemented with 1,650 sacks and the temperature log, made several hours later, showed that the cement reached the desired height.

Logs taken in all areas show that shales usually wash out considerably beyond the bit size while

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★ ***Patriotic*** because Desulfurized base stocks permit the use of less isooctane or alkylate in finished 100 octane blends, thus increasing the production of aviation gasoline from a given quantity of blending agents.

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PERCO DIVISION

OF

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BARTLESVILLE, OKLAHOMA

sands stand closer to bit size. Shales drilled with a 9⅞-in. bit have washed out to 22 in. and averaged around 13 in. Behind 7-in. o.d. casing one sack of cement fills 4.1 linear ft. in a 9⅞-in. hole but only fills 1.17 linear ft. in a 13-in. hole. All caliper logs show that actual volumetric requirements of cement to be placed behind casing were greater than based on bit size.

Cementing liners in old wells.—When a liner is to be cemented in the open hole below the casing it is important to know the actual amount of cement required to fill the space behind the liner. Very often the space to be filled with cement behind a liner has been enlarged beyond its original size by three influences: (1) erosion by the circulating fluid getting through the bit while the well was being drilled; (2) by shooting with nitroglycerin; and (3) by erosion while the well was producing.

Gravel packing.—A caliper log provids basic information about the volumetric capacity of the portion of the well in which gravel is to be placed. It also shows the profile of the hole. The profile is important because certain shelf-like irregularities, if present, may have to be removed before full placement of gravel can be accomplished.

Acidizing.—Caliper logs taken before and after acidizing show the effect of acid on the diameter of the hole. The proper size and place for a squeeze packer can be located so that acid can be squeezed into the portion of low permeability.

Side-wall coring.—A caliper log not only shows the profile of sands, limes and other formations but also shows the length of the mechanical core takers required to reach from the coring device to the wall of a formation.

Drill-pipe failures.—One of the major problems of drilling oil wells is failure of drill pipe due to fatigue. The extensive study which has been made of this problem has been concentrated mostly on the steel and design used in the drill string. There is an important relation between the drill string and the irregular size of the hole in which it is rotating. The calipers can locate the enlarged portions of a hole which causes excess wobble.

Shooting wells with nitroglycerin.—Caliper logs show the amount and variation of enlargement obtained by nitroglycerin shots. This information is useful for studying the effectiveness of shots and different types of tamps.

Drilling in salt sections.—This type of formation goes into solution when in contact with water and a caliper log shows the extent of the enlargement. By successive changes in drilling technique when drilling in salt formations, and by successive caliper runs to determine the effect of each change of technique, the results can be measured and the proper technique developed.

Packer settings and formation testing.—Quite frequently the attempts to seat packers have failed for unknown reasons other than they "did not hold." They simply did not expand out to the formation. The calipers are being used to measure and locate seats for packers.

Geological correlations.—Caliper logging shows the tops and bottoms of formations for geological purposes. The physical profile of a hole usually contains a continuous series of peaks and valleys which represent different formations. This is due to the varying reaction of different formations to the drilling bit and to the hydraulicking of the drilling fluid as it is jetted out of the bit.

Acknowledgment

Acknowledgment is due to the pioneering work in open-hole calipering done by Myron Kinley, the famous oil-well shooter and fire fighter. His early efforts were with mechanical calipers, but later a joint experimental program between Kinley and Halliburton produced the present calipers which combine mechanical and electrical principles.

The Calculation of the Rate of Water Influx in Water-Drive Fields

By WILLIAM HURST

Research Engineer, Humble Oil & Refining Co., now associated with Core Laboratories, Inc., Dallas, Tex.

IN many cases it is the oil reserve, as well as water influx, in a reservoir that must be determined, and in order to be able to make this calculation, it is essential to assign a mathematical relationship for the varying water term that is compatible with conditions that are known to exist in the formation and gives an accuracy acceptable for engineering calculations.

The method described in this paper for the determination of water drive is based on the classical diffusivity equation. The derivation is developed by the application of D'Arcy's law for the flow of fluids through porous media to the equation of continuity. The final form, however, as applied to a slightly compressible fluid is given in vector notation, and expresses the divergence of the flow from an infinitesimal element of sand, as proportional to the pressure change per unit of time within the element itself. That is

$$a^2 \Delta^2 P = \frac{\partial P}{\partial \theta}$$

where Δ^2 is the Laplacian operator on pressure P in time θ, with the diffusivity constant equal to $a^2 = K/\mu\phi c$ in which K is the normal permeability, and ϕ the porosity of sand, with μ the viscosity, and c the compressibility of the water. Thus a solution that can be applied to the formation, and also satisfies the boundary limits of the oil reservoir and water formation, is essentially a solution of the water drive.

This theory of water drive has been successfully applied by various investigators to the study of water movements, as illustrated for the East Texas field. In the analysis of the problem the rate of oil production for this field was introduced in a solution of the equation to predict the pressure variations in the reservoir for different assumed rates. The solutions for water drive, as developed for East Texas, cannot be applied to a field which is subject to gas and water drive.

It is the experience of the author that for the fields studied, the radial-flow case for water drive has proved sufficiently accurate for most engineering purposes. It must be kept in mind that water drive can be effective not only as an influx of water from adjoining sands at the edge of a field, but also as a rising table, and in general water drive should not be limited entirely to the radial-flow problem.

Radial Flow

The physical interpretation of the boundary conditions for this case is that the oil field is concentric with the adjacent water formation and the water sand is considered to be initially saturated with water at the same pressure as the original reservoir pressure, but for increasing times pressure gradients are established. These gradients, in turn, are subject to the variations of the field pressure, and this effect is introduced into the mathematics by superimposing a sequence of constant terminal-pressure solutions, which essentially reproduces the pressure changes in the field. Thus by means of the calculus, and the application of D'Arcy's law at the periphery of the field, the water influx is determined as a function of reservoir pressure.

It has been observed that in the application of this theory to reservoir studies the physical values in the analytics, such as the diffusivity constant and the radius of the field, are not at all critical in evaluating the water influx. What is most critical in these analyses is the history of the reservoir pressures as it varies with time.

The author then develops a series of integral equations for the rate of influx of water into the oil reservoir at any time, θ, and the cumulative water influx up to this time. An alternative form of expressing the latter is also presented.

It may be pointed out, however, that the calculated rate of water influx is extremely sensitive to the pressure-time slopes, and therefore the accuracy of the calculations depends on the precision of the determination of the actual variations of the reservoir pressure with time. Fortunately, this limitation does not apply to the cumulative water-influx equation, and for all practical purposes straight-line relationships can be employed for this calculation if no other interpretation is possible. It must be added, however, that the most significant term in the calculation of the rate of water influx at time θ, say, is the $dP/d\theta$ slope at this instant.

In an illustrative calculation for a Gulf Coast field, it is the purpose to show the application of the theory to the determination of the cumulative water influx for the "broken line" pressure variation, and also to show the close agreement between the calculated relative water influx at various times and the corresponding cumulative water as determined from a volumetric balance on the field. The case illustrated is that for the radial flow of water.

The physical constants for the determination of the diffusivity factor for the field, as established from core analysis and the viscosity of the salt water at the reservoir temperature are given as follows:

$K/\mu = 200$ md., or $200/22{,}700 = 0.00882$ cu. ft./day/sq. ft./lb./sq. ft./ft.

$\phi = 0.28$, and with $c = 2.5(10)^{-6}$ cu. ft./cu.ft./lb./sq. ft. for water

Thus

$$a^2 = K/\mu\phi c = \frac{(0.00882)}{(0.28)(2.5)(10)^{-6}} = 1.260(10)^6 \text{ sq. ft./day}$$

The radius of this field is approximately $R = 7.850$ ft., so

$$a^2/R^2 = \frac{1.260(10)^6}{6.180(10)^7} = 2.04(10)^{-2} \text{ per day}$$

It is observed that there is fairly good agreement between the actual and calculated water influx which is arbitrarily chosen to represent the proportional variation of the water drive. This is true for the last eight surveys, although the first two are considerably off. However, this should not be construed as an inaccuracy in the theory of water drive for early times, but rather as a limitation of the volumetric-balance equation which is fairly insensitive to small pressure drops from the original reservoir pressure. The numerical coefficient which is determined from the volumetric and calculated water influx given in this table, is also listed. The constancy of this coefficient is a further check on the two sets of data. Thus for the last eight surveys, the numerical average of this coefficient is 896 with a standard deviation from the average of only 8 per cent.

Nomenclature

K = permeability relative to 1 centipoise, cu. ft./day/sq. ft./lb./sq. ft./ft.
c = compressibility, cu. ft./cu. ft./lb./sq. ft.
ϕ = porosity, fraction
a^2 = diffusivity, sq. ft./day
R = radius of reservoir, feet
H = sand thickness, feet
P = reservoir pressure, lb./sq. in.
θ = time, days
μ = viscosity of water in formation, centipoises

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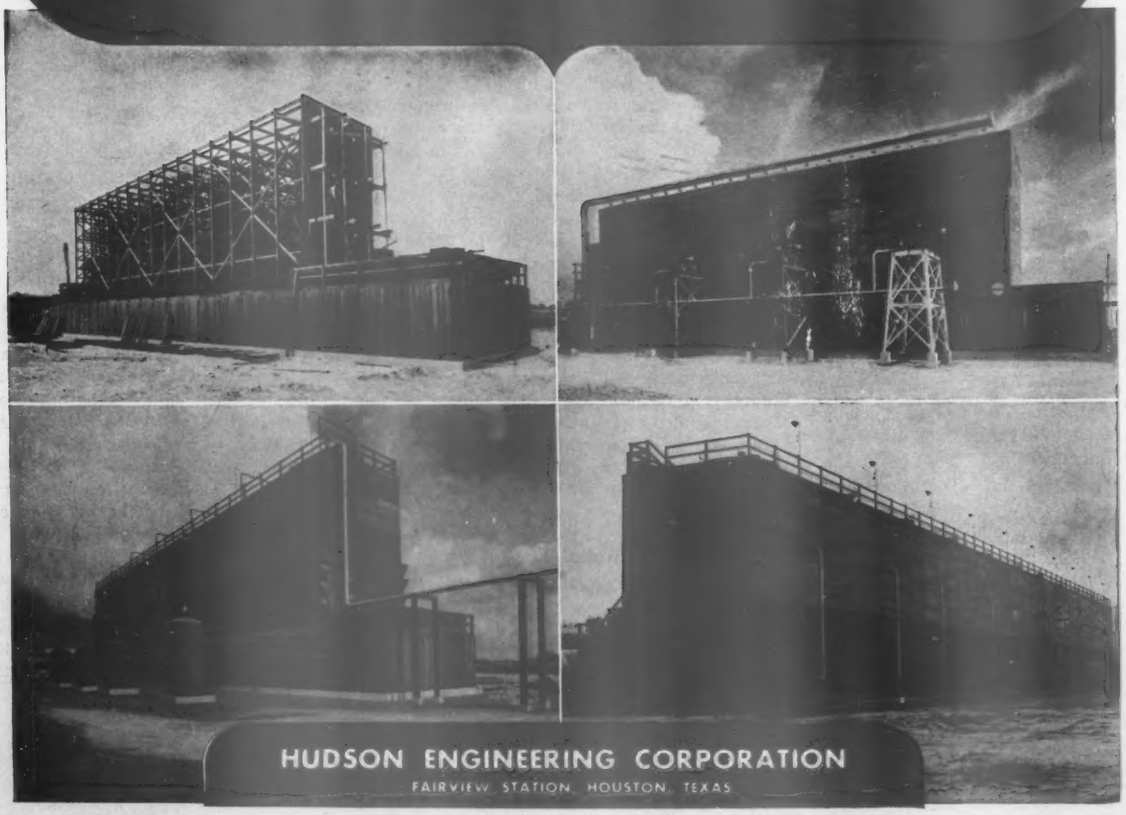


HUDSON ENGINEERING CORPORATION

FAIRVIEW STATION, HOUSTON, TEXAS

REFINERY ACTIVITY AND EXPANSION

Laboratory Analysis of Midway Field Crude

BOTH large and small refiners are closely watching developments in the new Midway field of Lafayette County, Arkansas, which was discovered last month by the Barnsdall Oil Co. There are 12 tests drilling in the field and three or four of these tests are scheduled for completion before the end of the month. Twenty-four locations were reported in the field last week.

Inquiries received by owners of drilling wells and leases indicate there will be numerous outlets for the crude as additional tests reveal the extent of the field. Refiners who have been obtaining all or a large part of their crude from the fields of the Illinois basin area are among the buyers who have been checking Midway field developments. It is believed that a proration program will shortly be inaugurated in the Illinois area which will reduce the crude available to local refineries and to the major pipe-line connections.

The following report gives a laboratory analyses of the crude taken from the discovery well.

Identification Barnsdall Oil Co. 1 Edgar Bond, crude—Lafayette County, Arkansas. Date tested January 4, 1942. Date received January 3, 1942.

Analysis of Crude

Gravity	35.5
Flash	Atmospheric
Fire	Atmospheric
Viscosity at 50° F.	65
Viscosity at 100° F.	42.5
Pour point	Below 0° F.
B.s. and water	0.1%
Sulfur	—1.32
Color	Dark green
Salt	.....

Hempel Distillation on Crude

% Cuts	Vapor temp. °F.	Gravity	Visc. 100° F.	Pour test °F.	Visc. 210° F.
I.B.P.	84	...	...	...	...
5.0	160	...	...	...	...
10.0	214	...	...	...	...
15.0	250	...	...	...	...
20.0	282	...	...	...	...
25.0	334	...	...	...	...
30.0	380	...	...	...	...
35.0	430	...	...	...	...
40.0	485	...	...	...	...
45.0	330	35.4	37	0	...
50.0	350	34.5	39	20	...
55.0	372	32.3	44	30	...
60.0	405	29.5	55	50	...
65.0	450	27.3	80	70	...
70.0	500	25.5	135	85	...
75.0	530	23.2	...	100	51
80.0	560	21.6	...	110	65
83.5	580	21.0	...	120	81
90.0	...	...	...	...	...
95.0	...	...	...	...	...

Amount charged 4,000 ml.
Distillation, pressure—reduced at 40 per cent to 5 mm. Abs.

Yield Data

Product—	Per cent	Vapor temp.	Gravity
Gasoline	15.0	250° F.	72.5
Naphtha	14.5	375° F.	52.4
Kerosene	9.3	475° F.	43.4
Gas oil	26.2	450 at 5 mm.	31.8
Wax distillate	18.5	580 at 5 mm.	22.9
Residue	14.8		7.9
Loss	1.7		

Analysis of Products

Product—	Gasoline	Naphtha	Kerosene
Gravity	72.5	52.4	43.4
I.B.P., °F.	80	220	344
10 per cent	124	264	398
20 per cent	142	276	404
30 per cent	158	286	410
40 per cent	172	298	420
50 per cent	187	308	426
60 per cent	202	318	434
70 per cent	217	328	444
80 per cent	236	340	454
90 per cent	264	357	472
95 per cent	298	370	488
End point	321	404	508
Recovery	98.0	98.0	98.0
Doctor	Neg.	Neg.	Pos.
Corrosion	OK	OK	Pos.
Sulfur	...	...	...
Octane, A.S.T.M.	59	37	...
Flash, °F.	...	...	152
Oct. No. with 1 cc. lead	70.6	47.0	...
Oct. No. with 2 cc. lead	76.8	55.0	...
Oct. No. with 3 cc. lead	80.0	60.0	...
PbO/1,000 bbl.	none	none	...
Mercaptan	none	none	...
H2S	none	none	...

Product—	Gas oil	Wax dist.	Residue
Gravity	31.8	22.9	1.0101
Visc. at 100° F.	45	waxy	.....
Visc. at 130° F.	..	.....	.....
Visc. at 210° F.	..	52	.....
Visc. index	...	...	...
Color	straw	2½	black
Flash, °F.	275	430	650
Fire, °F.	300	480	..
Pour point, °F.	40	105	...
Sulfur	...	...	...
Ductility at 77° F.	...	...	...
Ductility at 39.2° F.	...	...	...
Penetration at 77° F.	...	...	...
Float test at 122° F.	...	...	120
Fluidity factor	...	...	...
Melt point	...	...	...

New Restrictions Imposed on Exportation of Drums

WASHINGTON, D. C., Feb. 16.—New restrictions on the exportation of filled or empty metal drums and containers for oil, gas and other products have been announced by the Office of Export Control of the Board of Economic Warfare. The new provisions apply to exports under general and unlimited licenses, and become effective midnight February 20. The restrictions are as follows:

1. The exportation of all types of metal drums and containers, including gas cylinders, either filled or unfilled, will be authorized under general license to the following destinations only: Canada, Great Britain and Northern Ireland, Newfoundland, Greenland, and Iceland.

2. Metal drums and containers of a capacity of 30 gal. or less, except gas cylinders, may be exported under general license when filled with a commodity, the exportation of which has been authorized, to destinations 1 through 81, as listed in Comprehensive Export Control Schedule No. 5, and to Kuwait and territories occupied by the British Imperial Forces.

3. When exporting drums and containers under the above general licenses, the exporter should note the general license number for the said drums and containers on his export declaration.

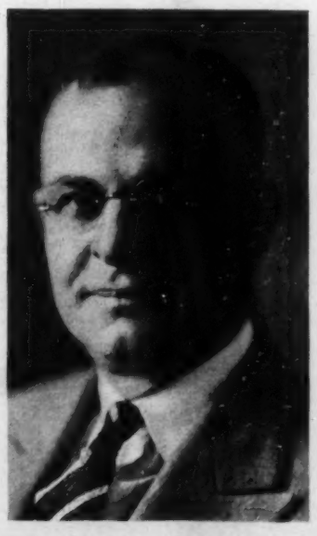
4. Metal cylinders designed to hold gas of any type will require individual export licenses regardless of capacity when being exported to destinations other than Canada, Great Britain and Northern Ireland, Newfoundland, Greenland, and Iceland, unless their exportation is authorized by existing unlimited licenses referred to hereinafter.

Seek Maximum Recovery Of Butanes and Isopentane

Successful carrying on of the nation's war effort will require maximum production of all grades of aviation fuel and synthetic rubber and all owners of plants producing new products vital to their manufacture have been requested to give information as to the largest quantities of these products they can produce, N. C. McGowen, chairman of the natural gas and natural gasoline committee for Texas, Louisiana, Arkansas, Mississippi, Alabama and New Mexico, said following a meeting of this committee in Houston, Tex.

"Existing and proposed natural-gasoline extraction plants, cycling, pressure-maintenance and repressuring plants are prime sources of butane, isobutane and isopentane and should be so constructed and operated as to facilitate the recovery of these elements in as large quantities as possible."

Sketches of Plant Operators . . .



H. W. CAMP, manager of refineries for Cities Service Oil Co. (Del.), is at heart an engineer and builder. But much of his time on this job must obviously be spent in supervising the operation of plants as well. He is especially happy at present because his company is building a large 100-octane aviation-gasoline unit at the East Chicago, Ind., refinery which, along with auxiliary equipment, brings the refinery crude capacity up to 30,000 bbl. daily. Also, this "northern" plant was "Hi's" suggestion when the company's refining interests were limited to the Mid-Continent area.

This urge to build is the reflection of his early training and experiences. He graduated in 1910 as a bachelor of science from the University of Washington. Later he was given the professional degree of civil engineer and as such joined the engineering staff of the Union Oil Co. at its Oleum, Calif., refinery. That was in the days when the California refining industry was in a building boom and the young engineer was on the ground floor to see the developments. So, in 1917, when Cities Service, operating its refineries in the Mid-Continent under the Empire Oil & Refining Co., sought to expand, it placed H. W. Camp in a junior executive position in the Bartlesville, Okla., offices of the refinery engineering department. He was the logical choice of general superintendent of the expanded organization when the need arose in 1920 and the following 10 years were crowded with expansion and exchanges, including the erection of the East Chicago refinery.

Mr. Camp has his offices in Bartlesville and he says "If you can't find me here, I'm at my new cottage on Grand Lake or I'm in Washington." Hunting is his hobby and when work permits, he is behind a duck blind somewhere in Texas or Oklahoma, or stalking big game in Wyoming or Montana.

Extra metal provides *Extra Value* in WeldELLS

BECAUSE the bursting stresses in an elbow are higher in the crotch* the wall must be somewhat heavier in this region if uniform strength is to be maintained. In WeldELLS this needed reinforcement is provided, thus assuring more nearly uniform stresses throughout the fitting.

This feature, based on soundest engineering considerations, is just one example of the *extra value* you get in WeldELLS — just one of eight good reasons for insisting on WeldELLS. And remember, please, that in spite of their premium quality WeldELLS and other Taylor Forge Welding Fittings cost no more.

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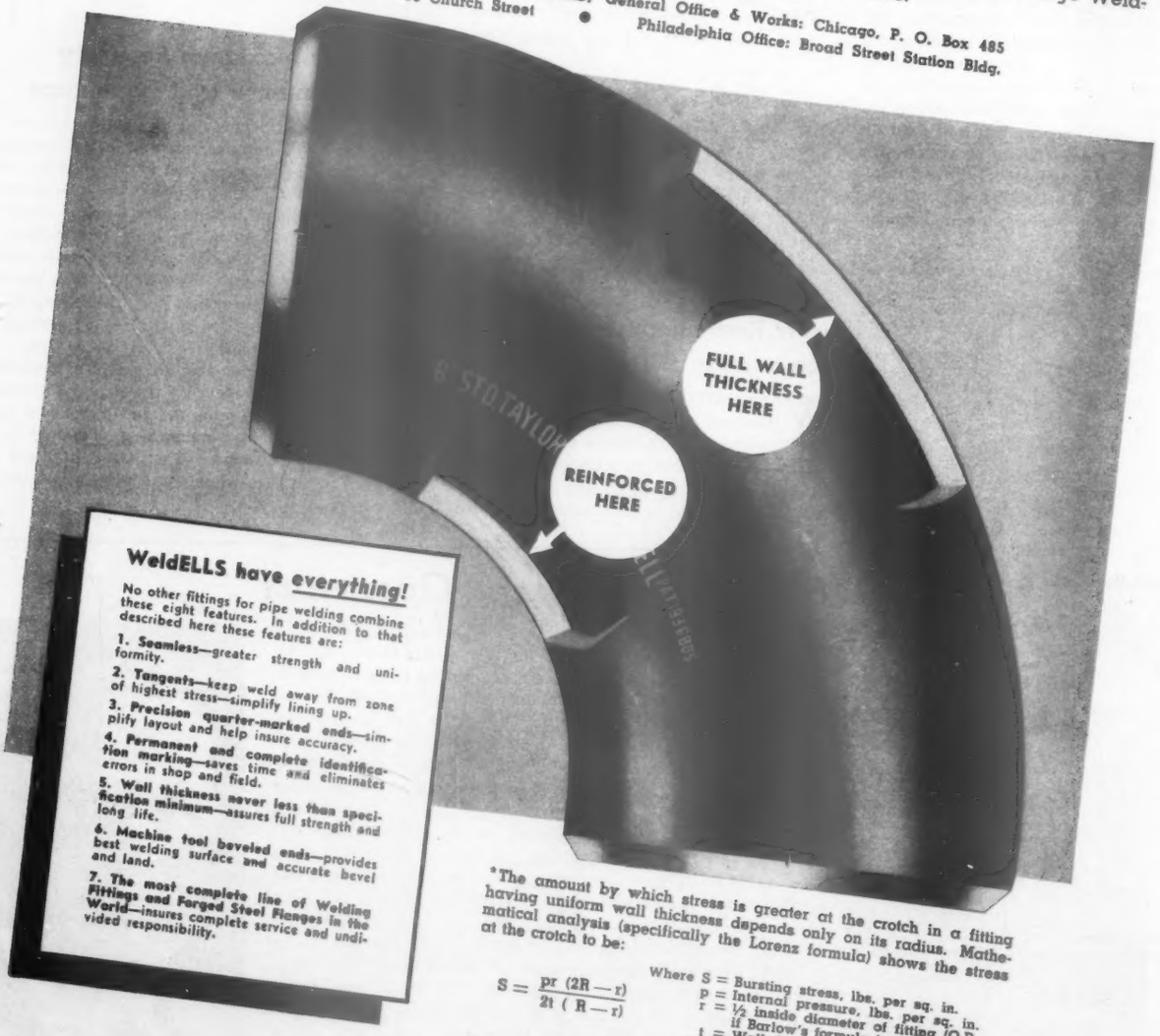


WeldELLS have *everything!*

No other fittings for pipe welding combine these eight features. In addition to that described here these features are:

1. **Seamless**—greater strength and uniformity.
2. **Tangents**—keep weld away from zone of highest stress—simplify lining up.
3. **Precision quarter-marked ends**—simplify layout and help insure accuracy.
4. **Permanent and complete identification marking**—saves time and eliminates errors in shop and field.
5. **Wall thickness never less than specification minimum**—assures full strength and long life.
6. **Machine tool beveled ends**—provides best welding surface and accurate bevel and land.
7. **The most complete line of Welding Fittings and Forged Steel Flanges in the World**—insures complete service and undivided responsibility.

*The amount by which stress is greater at the crotch in a fitting having uniform wall thickness depends only on its radius. Mathematical analysis (specifically the Lorenz formula) shows the stress at the crotch to be:

$$S = \frac{pr\,(2R - r)}{2t\,(R - r)}$$

Where S = Bursting stress, lbs. per sq. in.
p = Internal pressure, lbs. per sq. in.
r = ½ inside diameter of fitting (O.D. if Barlow's formula is desired).
t = Wall thickness in inches.
R = Center line radius of fitting, inches.

Numerous tests by the Research Division of Taylor Forge show the formula given above to be somewhat on the conservative side.

Pipe-Line Activity

Barton P. Sibole Becomes President Of Stanolind Pipe Line Co.

Barton P. Sibole, formerly vice president, has been made president of Stanolind Pipe Line Co. A. W. Peake, who was president, becomes chairman of the board of directors, a position he held prior to the retirement in November 1940 of Robert S. Ellison as president. Mr. Sibole has been in active charge of the company operations and will continue in that capacity, "merely," as he says, "changing titles." William G. Heltzel, vice president, will have somewhat enlarged duties.

Mr. Sibole has emphasized that he is not taking the position held by Mr. Ellison. "No one could take Mr. Ellison's place," he said. "Besides, Mr. Ellison was president of Stanolind Oil Purchasing Co., a position now held by Ralph O. Dietler."

Sinclair's Pennsylvania Gasoline Line Is Nearing Completion

MARCUS HOOK, Pa.—Completion of the Sinclair Refining Co.'s products pipe line from Marcus Hook, Pa., where the company has a refinery, and Pittsburgh, Pa., with arteries serving Baltimore, Md., and Washington, D. C., is scheduled in about a month.

The 8⅝-in. section of the line from Marcus Hook to Schaefferstown, Pa., is complete. The 6⅝-in. section from Schaefferstown to Blaine, Pa., will be finished this month.

Tennessee Gas & Transmission Applies for FPC Permit for Line to Serve Industries

An application for a certificate of public convenience and necessity has been received by FPC from Tennessee Gas & Transmission Co. to permit construction and operation of a natural-gas pipe line from southwestern Louisiana to Nashville, Chattanooga, Knoxville, and other Tennessee communities, and delivery of gas to existing pipe-line companies for transmission into Ohio and Pennsylvania to relieve a threatened gas shortage in the Appalachian area. A previous application was dismissed by FPC in July 1941, for want of jurisdiction. The new application was filed under the recently enacted amendment to Section 7 of the Natural Gas Act which was approved by the president on February 7, 1942.

The newly proposed line will bring gas from a point of convergence near Eunice, La., through 24-in. pipe to a point near Muscle Shoals, Ala., and thence to Brace, Lawrence County, Tennessee. From Brace, two main lines will diverge. One of these will be either 16-in. or 24-in. and will transmit gas to a point near Nashville. The other line will be 12¾ in. in diameter and will carry gas to a point near Alcoa and Knoxville, Tenn. Construction of lateral lines to aluminum and chemical plants of TVA and cities of Knoxville, Nashville, and Chattanooga, is contemplated. Construction of laterals to other communities in Tennessee and North Carolina must be postponed until after the war.

The proposed system will deliver 155,000,000 cu. ft. per day without compression, it is claimed in the application. With one compressor station located 282 miles from the beginning of the line, capacity can be increased to 204,000,000 cu. ft. per day. With compressors located at intervals of 94 miles the available capacity at Brace, Tenn., can be increased to approximately 300,000,000 cu. ft. per day, according to the application.

Mention is made of delivering gas from the proposed system to existing natural-gas companies such as Columbia Gas & Electric Co., Hope Natural Gas Co. and Kentucky Natural Gas Co.

Cities Service Will Construct Blackwell-Burbank Line

Cities Service Gas Co. will construct approximately 35 miles of 12-in. gas line from the Blackwell, Okla., compressor station to the Burbank, Okla., field, where it will supply gas for repressuring operations; it will also connect with the company's present pipe-line system to that area.

Electric-welded pipe will be used; this will weigh 27.2 lb. per lineal foot with 0.203-in. wall thickness. Solid welded construction will be used in laying the line. The company has been granted a priority rating for the pipe and construction will be started about April 1.

Federal Permit for Wisconsin System Requested by Natural Gas Pipeline

The Natural Gas Pipeline Co. of America asked the Federal Power Commission for authority to construct extensions of its pipe-line system to Milwaukee, Madison, Burlington, Racine, Waukesha, Sheboygan, Manitowoc, Two Rivers, Green Bay, Appleton, Fond du Lac, Oshkosh, Beloit, Janesville and other cities and towns in southern and eastern Wisconsin.

The commission said the company proposed to serve the eastern Wisconsin cities by extending its 20-in. line from its present terminus on the Illinois-Wisconsin boundary, approximately 13 miles south of Burlington, northward to Green Bay, Madison, Janesville and Beloit.

Natural Gas Pipeline says that it is ready to construct facilities as soon as the required pipe and other material can be obtained. In this connection it states that the company now has on hand sufficient material to construct about 22 miles of the main-line extension from the Illinois-Wisconsin boundary to a point immediately west of Milwaukee, Wis. Right-of-way has been purchased for this 22-mile line as well as for a 20-in. line north to Beloit and to a point east of Janesville, Wis., together with part of the right-of-way from Janesville to Madison, Wis.

"A very substantially less quantity of steel plate and other steel will be required," the company adds in its application to FPC, "than would be required by any other pipe line which might undertake to supply the Wisconsin market." The application also says that the introduction of natural gas will greatly expedite the production of defense equipment and materials by Wisconsin industries and that the national emergency requires the introduction of natural gas into that area with the least possible delay.

Natural Gas Pipeline's present lines and facilities, it is stated, have a rated capacity of 260,000,000 cu. ft. per day which would be immediately available for serving Wisconsin markets. Existing capacity, it is claimed, would be adequate to supply its present and proposed markets for a number of years and additional capacity could be obtained as needed from its reserves in the Panhandle field and by calling on the very large reserves in Hugoton field of Kansas, Oklahoma, and Texas.

Work Starts on Gas Line to Arkansas Defense Plant

Clearing of right-of-way, and welding operations for the construction of a natural-gas line to supply Defense Plant Corp., were commenced last week. Already 14 cars of 18-in. and 12 cars of 12-in. pipe have arrived. The project consists of 93 miles of 18-in. and 31 miles of 12-in.; this together with other pipe required for the program makes a total of 135 miles.

The line is being laid for Arkansas-Louisiana Gas Co., a subsidiary of Arkansas Natural Gas Corp. Construction of the line has been contracted by Midwestern Engineering & Construction Co., which has established a field office at Malvern, Ark.

When completed the system will provide gas from the Columbia County, Arkansas, sour gas fields as fuel for plants near Bauxite and Lake Catherine, near Malvern.

The main and branch lines will be built at an estimated cost of between $3,500,000 and $4,000,000. The lines will have 61,000,000-cu. ft. daily capacity.

Humble Loops Line in Ector County, Texas

Humble Pipe Line Co. is laying an 8-mile 8-in. loop between Judkins station and the south end of the Foster pool, Texas, to enlarge the capacity of the present 8-in. line. The company built a 10-mile loop south from Judkins station in July 1939.

Contract for the construction of the new loop was let to Permian Basin Construction Co.

Defense Pipe Line Project Is Discussed

WASHINGTON, D. C.—There is considerable informal discussion in Washington to the effect that the National Defense Pipe Line project which would extend from East Texas to the East Coast may be revived in the form of specific application for the necessary materials. Talk of reviving the Defense Line project remains strictly in the conversational stage. There is admission in most OPC offices, however, that the transportation situation to the East Coast is growing more acute. This was confirmed in all respects here in Washington when members of the Petroleum Industry Council from the Gulf Coast section declared that stocks were backing up at some plants at a rapid rate.

Atlantic Arranges for Tank-Car Shipments

Robert H. Colley, president, Atlantic Refining Co., said his firm would bring 17,000 bbl. of crude oil daily by tank cars to its Point Breeze refinery, near Philadelphia, Pa., from East Texas, Louisiana, and Mississippi. In this movement 1,000 tank cars will be used. Plans call for handling 85 cars daily at the refinery.

Most of the oil coming to the Atlantic's refinery in the Philadelphia area has been transported by ocean tanker. It is reported that the company has been forced to revise its transportation program because the Government has requisitioned company tankers for naval duty and because tanker movements have been disrupted by hostile submarine action. One of the company's tankers, the Francis E. Powell, was sunk off the Delaware capes late last month.

Under the new schedule, 4,000 bbl. daily will be shipped from Tinsley, Miss.; 3,000 bbl. daily will come from Neal, La.; 10,000 bbl. daily will come from East Texas.

WHEN BUYING GUIDING, FLOATING AND CEMENTING EQUIPMENT . . .

Don't Forget your 'Rithmetic!

In landing and cementing casing, the cost of the necessary guiding, floating, and cementing equipment represents *only a very small fraction* of the total well investment, yet the safety and efficiency with which these units do their job have a vital bearing on the future of the well as a profitable producer.

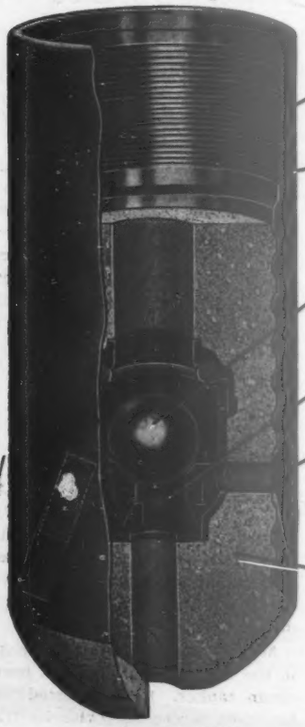
That is why the Baker Cement Wash-Down Whirler Float Shoe and Baker Cement Float Collar combination is the choice of operators *who want to be sure of safely landing* and then *efficiently cementing* their casing string. With Baker units nothing is left to chance . . . for Baker Shoes and Collars are designed, engineered, and manufactured to do THREE THINGS: (1) Land casing safely; (2) cement it efficiently; and (3) drill out easily.

AVERAGE OIL WELL
(Depth, 3800')
Total Investment approx. $25,000
Cost of Insurance on entire casing program . . . in the form of safe landing and cementing equipment consisting of . . .
One 10¾" Baker Cement Guide Casing Shoe
One 7" Baker Cement Float Collar
One 7" Baker Cement Wash-Down Whirler Float Shoe
. . . Approximately $143, or about ½ of 1% of the total investment!

The Most Efficient Cementing Shoe Ever Devised

BAKER CEMENT WASH-DOWN WHIRLER FLOAT SHOE

Here's Why!



Product No. 120

BAKER CEMENT WASH-DOWN WHIRLER *FLOAT SHOE

*(*The Baker Wash-Down principle is also available in a Guide Shoe)*

(1) THREADED CONNECTION FURNISHED TO FIT ANY TYPE CASING. Baker Floating Units can be furnished with threaded connection to fit the specifications of your casing. (Float collars can be furnished with both "female" and "male and female" threaded connections.) Manufacturing precision assures thread uniformity and accuracy.

(2) AMPLE STRENGTH. The seamless steel casing shoe into which the concrete plug and Plastic BALL-TYPE Valve Assembly are securely anchored provides a unit that has the STRENGTH to float the longest and heaviest string of casing with an ample factor of SAFETY.

(3) POSITIVE, LEAK-PROOF BACK-PRESSURE VALVE. The buoyant Plastic BALL-TYPE Back-Pressure Valve floats in the cement slurry or rotary mud and instantly forms a leak-proof double seal against a narrow, tough rubber ring (backed by Plastic and concrete) at the slightest reversal of pressure. Here is Valve Efficiency at its best.

(4) AMPLE CIRCULATION AREAS. The correctly designed, streamlined Valve Assembly provides passageways ample for any circulating or cementing operation . . . a fact attested to by actual field performance under the most severe operating conditions.

(5) BAFFLED WHIRLER PORTS. These whirler ports provide the important wash-down whirler action so advantageous in circulating and cementing operations. When the fluid strikes these baffled ports, a downward and then an upward whirling motion results. In running in, this whirling action provides a means of effectively washing away bridges. During cementing, the whirling action, imparted first to the fluid preceding the slurry and then to the slurry itself, properly prepares the hole to receive the cement. It then assures best possible distribution of a uniform body of cement around the shoe and the shoe joint, reducing the hazard of channeling to a minimum. Here is the ultimate in cementing efficiency.

(6) EASY DRILLABILITY. Complete and easy drillability results from the internal construction of Baker-Formula Concrete and Plastic . . . the Plastic BALL-TYPE Valve Assembly being set on end in the concrete plug to present a minimum cross-sectional area to the drilling bit. The concrete and the Plastic are quickly and easily drilled up and circulated out of the hole.

For complete details concerning Baker Cement Whirler Equipment, contact the nearest Baker office or field representative; or refer to Page 227 of the 1942 Baker (or Composite) Catalog.

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FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

Completions were off again last week, recording a decline of 36. There were 27 fewer oil wells, 19 fewer gas wells and 10 more dry holes, indicating a slight speedup in prospecting activity. The present record of 367 wells is just over one-half of the peak week of 1941 and most of the drop comes in the oil and gas producers. Many areas report a great reduction in the number of active operations and the actual decline is even greater than the reported drop owing to the fact that many standing rigs are reported as active operations. Illinois, for example, reports more wildcats than field wells and of the 199 operations reported at the end of January, 34 were drilling and 12 were rigging up. The remainder were standing. Of the 34 drilling wells, 15 were in fields, a far cry from the recent past when a field like Johnsonville would have twice as many wells going down as there are now in all of the fields in the state.

It is becoming apparent that many of the estimates of greatly increased demand were, at least temporarily, overoptimistic. The transportation bottleneck has again become responsible for large increases in stocks in the producing areas coupled with the likelihood of rationing in the industrial East. M-68 and P-98, therefore, are getting in their greatest effect at a time when the industry does not particularly want additional production from new wells. In many localities, it appears that additional closed-in production will be necessary if the storage situation is not to get out of hand.

If, later, the transportation problems are solved an intensive wildcat campaign may be found to have outlined a number of prospects which can meet the increased demand with a minimum of delay. In the meantime, the industry is certainly saving steel.

Illinois stands out as the banner area of the week in so far as prospecting is concerned. Its record of six prospects in a single week is almost equal to the average for the country as a whole during 1941. This concentration is not due to any intensive wildcatting campaign as there is none. It appears to be mainly coincidental. Of the new prospective fields, that in Perry County would be the county's first and would open up a considerable area.

WEST CENTRAL TEXAS: A west extension and a possible south extension are reported in the Wimberly field which now has 19 producers in six horizons (p. 73).

ARKANSAS: A second well in the Big Creek pool is running a little lower than the discovery and may yield oil rather than gas distillate. McKamie's plugged-back well which found production in the Cotton Valley is now flowing (p. 80).

MICHIGAN: Good completions are reported from Reed City and Headquarters. A St. Peter test in the Walker field is dry (p. 79).

NORTH TEXAS: Shows are reported in a Strawn test west of Worsham (p. 73).

ILLINOIS: With as many wildcats under way as field wells, a record possibility of six discoveries in a single week is reported. McClosky saturation is reported from tests in Richland and Jasper counties, the former of which flowed 1,090 bbl. after acid. The Cypress is showing oil in a test in Perry County as well as one in Clay County which also reports Benoist oil. The Benoist and Aux Vases are also showing saturation in tests in Clinton and Edwards counties (p. 75).

SOUTHWEST TEXAS: Frio-Vicksburg gas-distillate production is reported in southwestern Hidalgo County. A test on the northwest flank of the Sejita gas-distillate structure is flowing pipe-line oil. Another Pettus sand discovery is in prospect in Bee County (p. 65).

LOUISIANA GULF COAST: An outpost at Bayou Sale picked up a new shallow pay although the regular pay was found nonproductive. A southeast flank test on the Pine Prairie dome found showings in a shallow pay while two other outposts have a good chance of extending the regular pay to the east and northeast (p. 64).

CALIFORNIA: A wildcat west of the Anaheim has shown oil in several sands although none appear to be definitely commercial. Further testing will follow. Second wells at Turnbull Canyon, Helm and Riverdale all look like good producers. Ventura Avenue's deepest well has been completed at 11,516 ft., still in the Pliocene (p. 62).

TEXAS GULF COAST: Atlantic's wildcat in the Crosby area, Harris County, has again attempted to blow out, this time from the Yegua. Production has been found south of Anahuac (p. 69).

PENNSYLVANIA: Shallow production has been found in the Dunkard (Permian) sand east of the old Willow Tree pool in Greene County (p. 71).

OKLAHOMA: A gas producer near Guymon, Texas County, adds another link to the chain which may ultimately join Hugoton and the Panhandle gas field (p. 72).

KANSAS: The opener of the fourth pool in the 6-mile-long Peace Creek trend in Reno County has been completed. A new pool has been opened in the Kansas City-Lansing west of Abbyville (p. 70).

MONTANA: A good flowing well has been found in the Sunburst sand west of Cut Bank (p. 74).

WYOMING: A test on the Southwest Lance Creek structure is dry in the Lee sand. It will be plugged back to retest the Sundance (p. 74).

EAST TEXAS: Two Smackover lime tests have been started in Bowie and Hunt counties as a result of the Midway discovery in Arkansas (p. 68).

WEST TEXAS: Gas is reported from the Colby sand in a test east of the Emperor deep pool in Winkler County. Iatan has been extended to the northeast (p. 66).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended February 14, 1942)

	Oil	Gas	Dry	Total	Footage	Tll. comp. to date 1942	Tll. comp. to date 1941
N. Y., Pa., and W. Va.	44	6	4	54	123,532	651	571
Ohio	1	5	3	9	11,852	164	173
Indiana	1	0	2	3	7,026	63	47
Kentucky	1	0	3	4	4,744	59	76
Illinois	16	0	4	20	60,134	340	353
Michigan	10	0	13	23	61,932	118	107
Kansas	17	3	20	40	116,087	252	198
Nebraska	1	0	1	2	5,055	5	13
Missouri, Iowa	0	0	1	1	817	1	2
Oklahoma	13	1	12	26	87,839	221	176
Texas:							
North Central Texas	15	2	19	36	86,445	284	309
West Texas	23	0	1	24	106,349	270	235
Texas Panhandle	11	1	0	12	37,294	119	54
East Texas	8	1	2	11	61,980	80	158
Texas Gulf Coast	24	0	3	27	167,618	149	117
Southwest Texas	14	2	8	24	130,917	216	171
Total Texas	95	6	33	134	590,603	1,118	1,044
North Louisiana	4	0	2	6	25,857	94	82
Louisiana Gulf Coast	7	0	2	9	80,865	102	99
Total Louisiana	11	0	4	15	106,722	196	181
Arkansas	0	0	1	1	3,660	21	23
Mississippi and Southeast	1	0	0	1	4,996	20	24
Montana	5	1	0	6	12,079	27	35
Wyoming	1	0	1	2	11,318	10	19
Colorado	0	0	1	1	4,819	2	2
New Mexico	0	1	0	1	2,490	35	44
California	13	0	11	24	103,815	151	154
Total United States	230	23	114	367	1,319,520	3,444	3,242
Total previous week	257	42	104	403			
Week ended Feb. 15, 1941	280	57	120	457			

Extensive Activity in Western Canada Seen for Coming Year

By T. P. SANDERS

WESTERN Canada will probably see its greatest year of exploration and development in 1942. Foundations for the coming activity were laid during the past summer with the successful completion of a number of important tests, and several concerns are now preparing for their spring campaigns.

Because of the extensive nature of their undertakings, the work of Western Drilling Co., Ltd., is most significant. Late last summer this firm completed the first commercial producer on the Twin River structure in southern Alberta. The well maintained a production of 75 bbl. per day on a 10-day test, thereby proving the Twin River structure and enhancing the outlook for commercial production at three well-defined structures nearby, referred to as the Del Bonita, the Ross Lake, and the Spring Coulee structures. With many acres under lease on these southern Alberta anticlines, Western Drilling Co., Ltd., may assume a prominent position among Canadian operators in the near future.

The anticlinal structures named above lie northwest of the Kevin-Sunburst field of Montana, all within a 20-mile radius. They are situated on the northwest flank of the geanticline of which the Kevin-Sunburst field marks the crest. The Cut Bank field of Montana produces from a stratigraphic trap some 25 miles down the west flank of this geanticline. Along the north and northwest side of the regional structure there is a series of folds radiating outward from the crest. The Canadian structures are local closures on these anticlinal folds, or noses.

On the Chalk Butte nose there is the Del Bonita structure immediately adjacent to the international boundary, the Ross Lake structure 10 miles to the northwest, and the Spring Coulee structure another 10 miles to the northwest. The Twin River closure is on a parallel structure about 12 miles to the east, and here the Madison limestone lies closer to the surface than in any other known Canadian structure in the area.

Since the four Canadian structures are benches on the steeply folded anticlinal noses, their areal extent is quite small. However, drilling to date indicated that the oil formations penetrated on the Alberta structures are thicker than on the Montana structures. The new Twin River well has 20 ft. of productive Madison lime, while the Kevin-Sunburst area has 10 to 15 ft. of good oil zone at most locations. As in Kevin-Sunburst, the pay is found at the contact between the Madison formation and the overlying Ellis siliceous shale. The productive horizon of the Cut Bank field, found at the contact of the Ellis shale and the overlying Blairmore formation, is apparently barren on the Twin River structure.

History of Area

Most of the land on these four southern Alberta structures was originally leased by Nordon Oil Co., which was formed by a group of California and Washington State men. This group carried on extensive work of an exploratory nature, including geophysical surveys and core-hole drilling. Their first drilling venture was 1 Parco-Nordon, located on the Twin River structure in LSD 16, 34-1-20w of fourth meridian. Due to the hard formations penetrated, the test required 6 months to drill. Completed in January 1932, it was bailed to produce 100 bbl. per day of oil, but much water came in after it was heavily acidized in the Madison lime. The log shows that the well was apparently drilled too deep into the lime where bottom water was brought in by the acid treatment.

W. E. (Steve) Dunlap, consulting engineer, Western Drilling Co., furnished the information on which this article is based. When E. L. Cord acquired control of Western Drilling Co., he placed Mr. Dunlap in charge of operations in which capacity he was responsible for having a field laboratory driven from Dallas to Alberta in an endeavor to gain the fullest advantage from exploratory drilling.

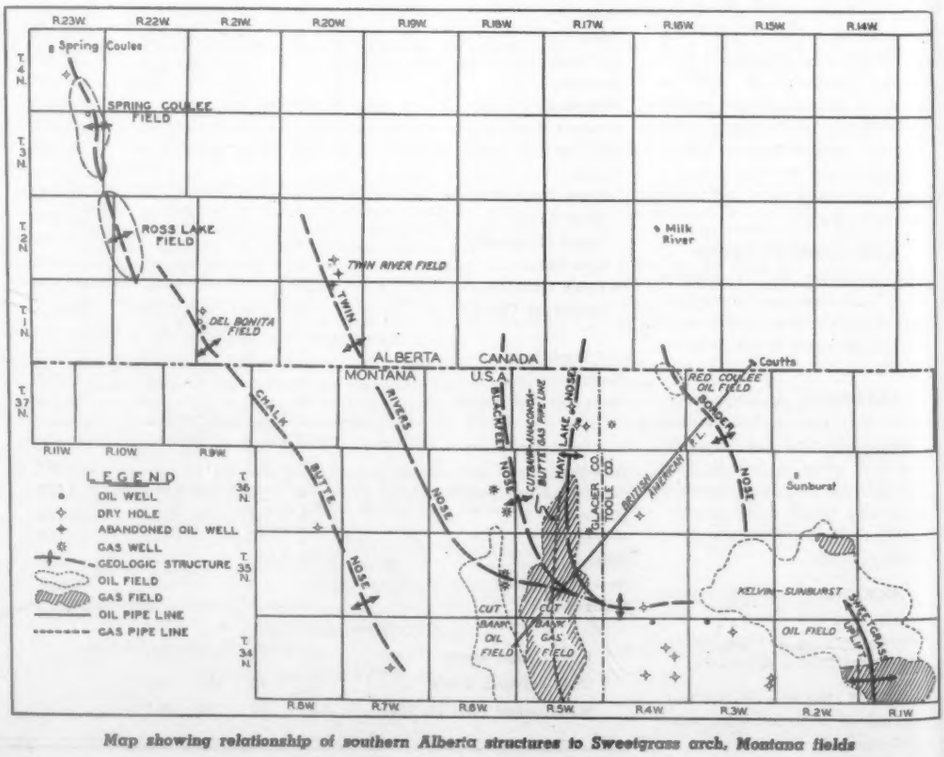
Next test was the Roney-Nordon 2 Twin River in Section 2, Township 2, which was drilled by S. Myron Zandmer, Los Angeles geologist, and Frank R. Henry, who had formed the Terminal Oil Co. The well came in for 6,000,000 cu. ft. of gas per day with some oil, showing a formation pressure of 1,250 lb. Although it is now plugged it produces a small amount of gas through leakage, and this is used locally. This well also went too deep into the lime according to engineers who know the area.

The third Twin River test, drilled by the Del Bonita Association in Section 10, Township 2, produced no oil, but it is now believed that the prospective measures were cased off due to a mistake in well measurements.

In 1939 Western Drilling Co., Ltd., was formed by Zandmer, Frank E. Ruben of Los Angeles, and E. L. Cord, Indianapolis automobile manufacturer. With new capital invested by Cord the firm began an aggressive exploration of the old Nordon properties that had been incorporated into its ownership. Early in 1941, Mr. Cord became sole owner of Western Drilling Co., Ltd., with Ruben and Zandmer retaining separate holdings.

When Western Drilling Co. 1 Twin River was being drilled in, a truck-mounted field laboratory for analyzing cores was driven from Dallas, Tex., to make available additional information that could be used in overcoming completion problems. The well was drilled under the superintendence of Jess R. Rector, who was brought from the California fields by Mr. Dunlap. Drilling had been slow, requiring 32 bits to drill the first 2,900 ft. Using heavy rotary mud to guard against the high pressures that had been found in the Roney-Nordon well, the hole was drilled to 3,945 ft. before oil-bearing formation was cored.

Using the portable laboratory to analyze each core immediately after it was withdrawn from the well, the oil-bearing limestone was cautiously drilled, a few feet at a time. After coring 19 ft. of oil strata, a hard shale streak was unexpectedly penetrated from 3,964-66 ft. Below this shale was additional oil strata of good porosity. A purely visual inspection of this core brought forth the conviction that drilling should be continued in order to take in more of this good-looking second



Map showing relationship of southern Alberta structures to Sweetgrass arch, Montana fields

"pay." Fortunately, however, the cores were subjected to complete analysis before further drilling was permitted. The tests showed horizontal permeability of 20 md., while the vertical permeability was 100 md. This comparison made it certain that acid applied to the well would be forced downward in great quantity, thereby bringing in bottom water. The presence of bottom water was of course known from records of previous drilling on the structure, but its proximity was disclosed by core tests.

Oil pays are distinguished from wet pays by the fact that their oil-water ratios are sufficiently high so that they will give up oil rather than water when a slight pressure gradient is established. Thus there is a critical oil-water ratio for a given pay below which water will be produced instead of oil. Cores cut from the greatest depth in the Twin River well indicated sufficiently high oil-water ratios to classify the strata as oil productive, but since the water content approached the critical ratio, it was quite definitely established that deeper drilling or acidizing would mean water production in quantity. The decision was therefore made to plug back to the top of the shale break.

The plug-back job, like the rest of the completion procedure, made use of modern methods. The cement was placed on bottom with a cellophane mat above, both with the dump bailer. After the hole had been bottomed at the desired point in this manner, 7-in. casing was cemented at 3,947 ft., thereby shutting off 2 ft. of oil strata in which a high gas-oil ratio was indicated. Of the oil strata left exposed in the well, the estimated possible recovery, as obtained by core analyses, was 527 bbl. per acre-ft. Porosity of this limestone ranges from 10 to 25 per cent.

After acid treatment of the well, the fluid level rose to a point 1,000 ft. below the surface, and pumping equipment was thus needed to inaugurate production. This was somewhat disappointing because the high gas pressures encountered in the Roney-Nordon well had aroused expectations for large flowing production wherever water could be avoided. The original oil production was accompanied by 10 bbl. per day of water production, and this has remained constant while the oil production has declined to 50 bbl. of 32-gravity crude per day. Although its production is not impressive by any standards, the well is important as the first successful completion of the area. Its low production can be attributed in part to the fact that it is 17 ft. lower structurally than the Roney-Nordon well nearby.

The entire Twin River structure is now under lease by E. L. Cord's Western Drilling Co., Ltd., and Paragon Oils, Ltd., which is a new firm organized by the partners, Zandmer and Ruben. With only two operators, competitive drilling would appear unlikely. However, both operators intend to engage in unstinted development with the coming of spring because war legislation is expected that would tend to force drilling regardless of other considerations.

Reflection seismograph work at Twin River revealed that the apex of the structure at depth is east of the center of the surface structure. Similar prospecting work, together with core-hole drilling, showed that the same condition exists at the Del Bonita structure.

Two tests have been drilled to inconclusive depths on the Del Bonita structure, one flowing 10 bbl. of oil with 1,500,000 cu. ft. of gas per day from the Madison lime at 5,136 ft. Western Drilling Co., Ltd., has been redrilling a joint test on this structure with Paragon Oils, Ltd., but a fishing job has made skidding of the derrick necessary, and the new hole will be started after the spring thaw. The old hole was drilled to 5,211 ft., encountered excellent showings, and flowed for a few days until it suddenly quit, due perhaps to a lowering of bottom-hole pressure. Further

(Continued on Page 67)

What about-

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Test in Anaheim District Shows Promise of New Pool

By L. P. STOCKMAN

LOS ANGELES, Calif.—The closest thing to a new discovery in Los Angeles Basin since the discovery of the Turnbull Canyon field by Continental Oil Co. is 1 Spencer of Texas Co. in 1-4s-11w about 5 miles west and slightly north of Anaheim in Orange County. This wildcat, which is located in the Buena Park section, has shown limited quantities of 20-gravity oil and while it is too early to predict that Texas has found a new oil field, the outlook is very encouraging. Many wildcats in this area have shown small amounts of oil in the past but none has ever looked as promising as 1 Spencer. This wildcat was drilled to 9,660 ft. and was subsequently cleaned out to 9,600 ft. after 5½-in. casing had been cemented on bottom. The 5½-in. was then perforated at intervals at 9,500-9,600 ft. and on a test the well showed a small amount of water, mud and a small amount of 15-gravity oil. Not very much fluid was recovered during this test and the hole was then plugged back to 9,250 ft. Gun perforations at 9,200-50 ft. showed all salt water, following which the hole was plugged back to 8,765 ft. A test of the formation at 8,740-65 ft. after the 5½-in. was again gun-perforated resulted in a short flow of 20-gravity oil with a cut ranging from 15 to 50 per cent. Particular attention is called to the fact that 15-gravity oil was found at 9,500-9,600 ft. during a test of that interval and a showing of 20-gravity oil at 8,740-65 ft. Texas' field department is making a careful check of the hole by checking each interval where showings were noted during the course of drilling. The present wildcat is of special interest, even though it is ultimately abandoned as unproductive commercially or finished as a small well, because it tends to indicate the possibility that there is a commercial accumulation in the immediate neighborhood. Approximately 200 bbl. of 15 and 20-gravity oil has been produced to date and therefore the company may find it necessary to undertake additional work before 1 Spencer can be classified as a discovery or a dud. Velocity tests are being made and no stone is being left unturned in efforts to make this well a commercial producer.

The Buena Park wildcat of Texas Co. is a seismograph play as have been most of the other wildcats in this general area. In addition to this the company's geological department has had the benefit of several logs of other wells drilled in the district. Texas has a block of about 2,500 acres around its wildcat and would therefore benefit to a substantial extent if commercial production should be developed. Other operators holding adjacent acreage include Southern California Petroleum Co., Wilshire Oil Co., Pacific Western Oil Co., Herley-Kelly and others. Irrespective of the outcome of 1 Spencer, Texas Co. will do additional work in the Buena Park area as it cannot now pull out in view of the showings found to date. There is a possibility that this wildcat may be an edge well in a new field or that a fault has permitted the natural gas and more volatile fractions to escape, leaving a low-gravity oil present. The formations tested out appear to have fairly favorable porosities and permeabilities, judging from core samples recovered during the course of work.

No. 1 Spencer of Texas Co. in the Buena Park area is about 2 miles northwest of a test the company drilled on the Stanton property in 8-4s-10w to a depth of 8,988 ft. This is well below the point where the most favorable showing was tested in 1 Spencer at 8,740-65 ft. which indicates any potential field is located to the west of north. About 1½ miles east of the Stanton wildcat of Texas Co., Shell Oil Co. drilled a test on the Harbeson property to a depth of 8,608 ft. and abandoned the hole at that point. About 10 miles east and a little south of 1 Spencer, the present wildcat that has shown up quite favorably, Texas drilled its Oliver wildcat to 5,347 ft. and abandoned the hole as unproductive. About 5 miles due south of 1 Spencer, United Oil Co. drilled a deep duster on the Schming property and abandoned at 9,305 ft. Numerous other wildcats have been drilled in the Santa Ana-Anaheim quadrangle but in most cases the holes were abandoned above the point where Texas found the two zones in its Spencer wildcat. California could use another primary field to advantage inasmuch as the state's reserves of crude oil have been declining for the past 2 or 3 years. Gas reserves, due to the discovery of numerous gas fields previously and a slow rate of development and production are about equal at present to the total production of natural gas up to date. That is quite a record and far exceeds the performance of oil fields with respect to crude-oil reserves. It must be remembered, however, that the several fields discovered last year are still enigmas due to limited development to date. It may be possible that one or more of the 10 fields discovered last year may turn out to be major discoveries in which event the crude-oil reserve picture would be changed and the reserves increased.

Second Turnbull Canyon Well Near Completion

Continental Oil Co. is putting the finishing touches on 2 Turnbull Community in the Turnbull Canyon field of Los Angeles County and should have this, its second well, producing within the next day or two. The company's discovery well at Turnbull Canyon failed to show enough kick to result in a natural flow and required artificial stimulation. This well did not look as good as 2 Turnbull and therefore the latter should prove a much better producer. The company's field department is not making any claims but those who have been following the well daily think there is a good possibility that Continental's second completion at Turnbull Canyon will be a flowing well in contrast with 1 Turnbull which was brought in on the beam doing 225 bbl. daily. No. 2 Turnbull Community which is located west and slightly south of the initial well encountered a fault several weeks ago and the company was obliged to whipstock the hole to the northwest. The Turnbull Canyon fault encountered by 2 Turnbull of Continental Oil Co. has a northwest to southeast trend and appears to cut the potentially productive limits of the field in half.

LOS ANGELES BASIN COMPLETIONS

Centinella wildcat district, Los Angeles County: Baker Cliff 1 Centinella, 29-2s-14w, dry, T.D. 6,550 ft.; small showings logged but no solid oil sand found.

Chino wildcat district, Riverside County: Prado Pet. Co. 1 Chino, 31-2s-7w, dry, T.D. 1,550 ft., only minor showings found and of these there is some question whether they came from formation or reflect contamination of drilling mud.

Inglewood, Los Angeles County: Jergins Oil Co. 3 Howard, 7-2s-14w, flowed 450 bbl., 29.2-gravity, 0.5 per cent cut, 750,000 cu. ft. gas, 16/64-in. bean, pressures 400/600 lb., T.D. 8,498 ft., perf. 5½-in. liner 7,889-8,389 ft., perf. 4½-in. liner 8,398-8,496 ft., top Nodular shale 7,965 ft., completed in Sentous zone of Miocene age.

Manhattan wildcat district, Los Angeles County: Dominguez Extension Oil Co. 1 Manhattan, 19-3s-14w, dry, T.D. 7,865 ft., several small showings of oil and gas found but no solid oil sand cored.

Puente wildcat district, Los Angeles County: Kosanke, J. F., 1 Puente, 24-2s-10w, dry, T.D. 1,823 ft., no important showings logged.

Torrance, Los Angeles County: Barnhart-Morrow Cons'd. Oil Co. 1 Spring, 30-4s-13w, pumped 105 bbl., 17.3 gravity, 30 per cent cut, T.D. 3,717 ft., perf. 3,185-3,237 ft., 3,267-3,367 ft., 3,557-3,717 ft., completed in equivalent of Ranger zone.

Wilmington, Los Angeles County: Bond Pet. Corp. 1 B & K, 33-4s-13w, pumped 75 bbl., 16.1 gravity, 5 per cent cut, T.D. 3,460 ft., gravel-packed perf. 3,132-3,458 ft., completed in Ranger zone.

Davis, Lee S., 3 Vaughn, 29-4s-13w, pumped 175 bbl., 17.2 gravity, 18 per cent cut, T.D. 3,704 ft., gravel-packed perf. 3,045-3,135 ft., 3,189-3,320 ft., 3,485-3,703 ft., completed in Ranger zone.

Petromont Oil Corp. 6 Wilmington, 29-4s-13w, flowed 190 bbl., 15.6 gravity, 5 per cent cut, 35,000 cu. ft. gas, 26/64-in. bean, T.P. 100 lb., T.D. 3,735 ft., gravel-packed perf. 3,041-3,160 ft., 3,198-3,290 ft., 3,500-3,600 ft., 3,670-3,725 ft., completed in Ranger zone.

Second Helm and Riverdale Wells Testing

Developments in the San Joaquin Valley this week centered around tests made by Amerada Petroleum Corp. on 5-27 Weyant in 27-16s-17e, at Helm and 54-26 Jensen in 26-17s-19e, at Riverdale. These two wells are located in new fields discovered last year by Amerada Petroleum Corp. and operators are closely watching developments to ascertain if either or both will prove to be of major importance from a production standpoint. The initial well in each area indicated possibilities of extensive accumulations but even with two wells in each field one will not be definitely certain of prolific production unless the second completions show large production. At Helm, the company recemented with 50 sacks of cement and a cement retainer set at 8,063 ft. This well previous to being killed for the recement job, was flowing 246 bbl. of 24.1-gravity oil cutting 22 per cent daily and 129,000 cu. ft. of gas through a 15/64-in. bean behind 265 lb. tubing pressure. Production was coming from 20 holes shot in the 5½-in. at 8,100-10 ft. and 2-in. tubing was used with a packer at 8,063 ft. In the Riverdale field a satisfactory water shutoff was effected behind 7-in. casing at 6,775 ft. in 54-26 Jensen whereupon the crew cleaned out to 6,915 ft. On a formation test at 6,775-6,915 ft. with a 1,000-ft. water cushion and open for 15 minutes the well blew gas at a daily rate of 14,000,000 cu. ft. The recovery in the tester consisted of 110 ft. of 37.4-gravity oil and 286 ft. of gas-cut mud, oil, and emulsion. The hole was then drilled ahead to 6,941 ft. at which point a twistoff occurred. In the Raisin City field, another productive area in Fresno County, all work has been suspended and may remain inactive for some time as it is not possible for operators to establish any uniform method of spacing in the light of what is known of the field to date. This is one field in California in which OPC should grant immediate exceptions in order to permit operators to proceed with development work and ascertain if the field warrants additional work. Another five wells should determine this and if it is found that the field does not produce enough crude and natural gas to justify additional drilling future work could be suspended. As the matter stands at present it is not possible to correlate the lenticular sands across the structure and therefore it will take the drilling of several additional wells to determine the production possibilities of the area.

SAN JOAQUIN VALLEY COMPLETIONS

Kern River, Kern County: National Oil Co. 28 Kern, 20-28-28e, pumped 10 bbl., 13.1-gravity, 7 per cent cut, T.D. 990 ft., P.B. 940 ft., perf. 760-950 ft., completed in Kern oil sand of Kern River series of Pliocene age.

Midway-Sunset, Kern County: C. C. M. Oil Co. 15-35 Government, 35-31s-22e, pumped 50 bbl., 12.1-gravity, 40 per cent cut, T.D. 2,853 ft., 125-mesh perf. 2,550-2,700 ft., completed in Republic sand of Pliocene age.

Standard 72-27-B fee, 27-31s-23e, pumped 66 bbl., 19.5-gravity oil, 28 bbl. water, T.D. 3,070 ft., perf. 2,654-2,774 ft., 3,014-69 ft., top Wilhelm sand 2,592 ft., Gusher sand 2,662 ft., completed in Lake View oil sand of Pliocene age.

Parkfield wildcat district, Kings County: S. F. Easterbrooks 1 Parkfield, 11-23s-16e, dry, T.D. 810 ft., no showings found.

Union Avenue, Kern County: Hancock Oil Co. 4 Roberts, 6-30s-28e, pumped 50 bbl., 14.1-gravity, 75 per cent cut, T.D. 5,377 ft., cleaned out to 5,060 ft., perf. 5,020-35 ft., swabbed wet and recemented, then shot 60 holes 5,025-38 ft., completed in Roberts zone of probable Santa Margarita formation.

Carpinteria Tar Sand Logged in Shallow Test

Century Oil Co. is preparing to make a production test on its core hole on the Hall property in the Carpinteria district of Santa Barbara County and present indications point to the possibility the company may develop production in its present well. This core hole has cored a little more than 55 ft. of heavy tar sand at 719 ft. The company landed a string of casing and is preparing to install pumping equipment. This heavy tar zone has been known to exist in the Carpinteria region for many years and at one time there was an asphalt quarry nearby. The California Indians were familiar with the existence of the quarry long before the advent of the white man into California. Portola's expedition in the early days carries an account of how they found the Indians "pitching their canoes within and without with brea." Production difficulties to date have been encountered in producing heavy tarry masses such as this even with steaming. It may be possible, however, that Century may find the viscosity such that it can be produced economically.

Deepest Producer in Ventura Avenue Near Completion

Tide Water Associated Oil Co. did not hold its deep-drilling record in the Ventura Avenue very long because Shell now holds the record with a depth of 11,516 ft. reached in 1-A Shell-Lloyd. This well, on a formation test, with 1,524 ft. of 5-in. liner landed at 11,516 ft., flowed at a daily rate of 1,500 bbl. along with 900,000 cu. ft. of gas. It will be officially completed in the conventional manner within the next few days. Tide Water's 18 McGonigle, which held the deep-drilling record for the Ventura Avenue field for about 10 days with a depth of 11,350 ft., should likewise be completed within another few days. Both deep wells are still in Pliocene of which it is estimated there must be at least 15,000 ft.

COASTAL DISTRICT WILDCATS

Bardsdale wildcat district, Ventura County: Palma Oil Co. 1 Elkins, 6-3n-19w, dry, T.D. 3,057 ft., no oil or gas showings are recorded on well log.

Castaic wildcat district, Los Angeles County: R. T. Colter 1 Ramona, 8-4n-17w, dry, T.D. 1,450 ft., shallow test only, no important oil showings logged.

Texas Co. 1 Fernando, 11-4n-17w, dry, T.D. 8,034 ft., first oil showings noted in core 5,473-81 ft., recovered 1½ ft. dark brown heavy oil sand and 2 ft. siltstone and gray sand. Formation test 5,664-5,874 ft., open 65 min., recovered 2 stands heavy mud, 4 stands thin mud, 3 stands watery mud and 30 stands slightly muddy to clear water. Showing was found in Pliocene; abandoned in Miocene.

Cat Canyon, Santa Barbara County: Standard 4 Los Flores, 27-9n-33w, pumped 531 bbl., 13.4-gravity, 0.7 per cent cut, T.D. 6,144 ft., perf. 5,770-6,144 ft., completed in Los Flores sand of Miocene age.

Del Valle, Los Angeles County: R. E. Havenstrite 1 Liebhart, 15-4n-17w, flowed 129 bbl., 42.1-gravity, 3 per cent cut, 1,180,000 cu. ft. gas, 32/64-in. bean, tubing pressure 200 lb., T.D. 7,253 ft., P.B. 7,150 ft., gun perf. 7,043-48 ft., 7,052-61 ft., 7,072-80 ft., 7,084-86 ft., 7,092-96 ft., completed in Modelo zone of Miocene age.

Herley & Kelly 2 Videgain, 17-4n-17w, pumped 175 bbl., 32.9-gravity, 10 per cent cut, T.D. 5,978 ft., P.B. 5,951 ft., perf. 5,901-51 ft., completed in Modelo oil zone of Miocene age.

Ohio 2 Vasquez, 17-4n-17w, dry, T.D. 6,292 ft., perf. 6,202-42 ft., log shows gray sand 6,021 ft., oil sand 6,202-42 ft., poor oil sand and gray sand

(Continued on Page 67)

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LOUISIANA GULF COAST

New and Shallower Sand Is Found at Bayou Sale

By F. L. SINGLETON

NEW ORLEANS, La.—The Bayou Sale field, St. Mary Parish, Louisiana Gulf Coast's most outstanding discovery in 1940, received a new and shallower sand with the completion of Humble 3-B Wooster which is flowing at the rate of 2 bbl. of 38.2-gravity oil per hour through a ¼-in. choke from perforated casing opposite oil sand at 4,552-57 ft. The well is located about 2,000 ft. southeast of the discovery well on the east side of the structure, and while the well opens a new sand it apparently defines production in the 10,100-ft. and 10,300-ft. sands as the well was drilled to a total depth of 11,800 ft. and was plugged back and completed in the shallow sand after a series of tests in the lower sands failed to produce.

Three Pine Prairie Outposts Ready to Test

In the Pine Prairie field, Evangeline Parish, preparations are being made to test three wells, all of which may extend production. Probably the most important test is E. J. Nicklos 2 Reed on the southeast flank which is preparing to test what appears to be a new sand. Total depth of the hole is 7,817 ft. and 7-in. casing was cemented on bottom preparatory to testing sand at 7,766-95 ft. which recorded 70 millivolts porosity and 70 ohms resistivity on an electrical survey. Completion of the well would open a new producing horizon approximately 500 ft. higher than the original pay found from 8,200-8,300 ft. Other wells preparing to test are Humble 1 Guillory on the northeast flank and Stanolind 1 Ardoin on the east flank, both of which are reported to have cored the regular pay, and successful completions would extend production in both directions. In the meantime, development on the south flank was questionable as L. M. Josey 1 Sam Haas is shut down at a total depth of 8,139 ft. after coring salt-water sand at 8,065-8,110 ft. Exploration on the southwest flank of the dome is being resumed by the Texas Co. which is preparing to drill 2-B Ledanois Land & Stone Co. in 35-3s-1w, located a short distance from a 9,000-ft. hole recently abandoned after drilling into salt formation. Slight showings were reported in the first well, and better results are expected by drilling further out from the salt mass.

Shows Reported in Charenton Outpost

In the Charenton field, St. Mary Parish, Fifteen Oil Co. 2 South Coast Corp. located on the south side of the structure was being watched with considerable interest as the well is drilling in shale below 9,535 ft. after cementing a protection string of casing at 9,509 ft. While details of the well are not available, it is reported that the sand from which the company's 1 South Coast attempted to blow out several months ago was apparently missing. Main production in the field is from shallow sands on top of the structure.

Superior 1 C. K. Schwing, an important south flank test for the Bayou Blue dome, Iberville Parish, is drilling below 5,020 ft. An electrical survey logged the cap rock at 4,946 ft. and thus far no shows of oil or gas have been reported.

George Echols 2 Armelise Planting Co., located on the northeast flank of the old Napoleonville dome, Assumption Parish, was abandoned in salt at 9,131 ft. and the operator is moving the rig to the Westwego field in Jefferson Parish for 2 Marrero Land & Improvement Co. Development at Napoleonville is expected to be resumed in the near future in view of the showings logged in the three deep tests that have been drilled around the flanks of the structure.

LOUISIANA GULF COAST COMPLETIONS

Fields

Erath, Vermilion Parish: Phillips 1 Caldwell, dry, T.D. 11,984 ft.

Golden Meadow, La Fourche Parish: Bering 1 Jambon. 125 bbl., 9/64-in. choke, perf. casing 5,142-54 ft., T.D. 5,498 ft.

Grand Bay, Plaquemines Parish: Gulf 14 State, 358 bbl., 5/32-in. choke, perf. casing 8,740-50 ft., T.D. 10,041 ft.

Pecan Lake, Cameron Parish: Superior 3-B Miami Corp., dry, T.D. 11,020 ft.

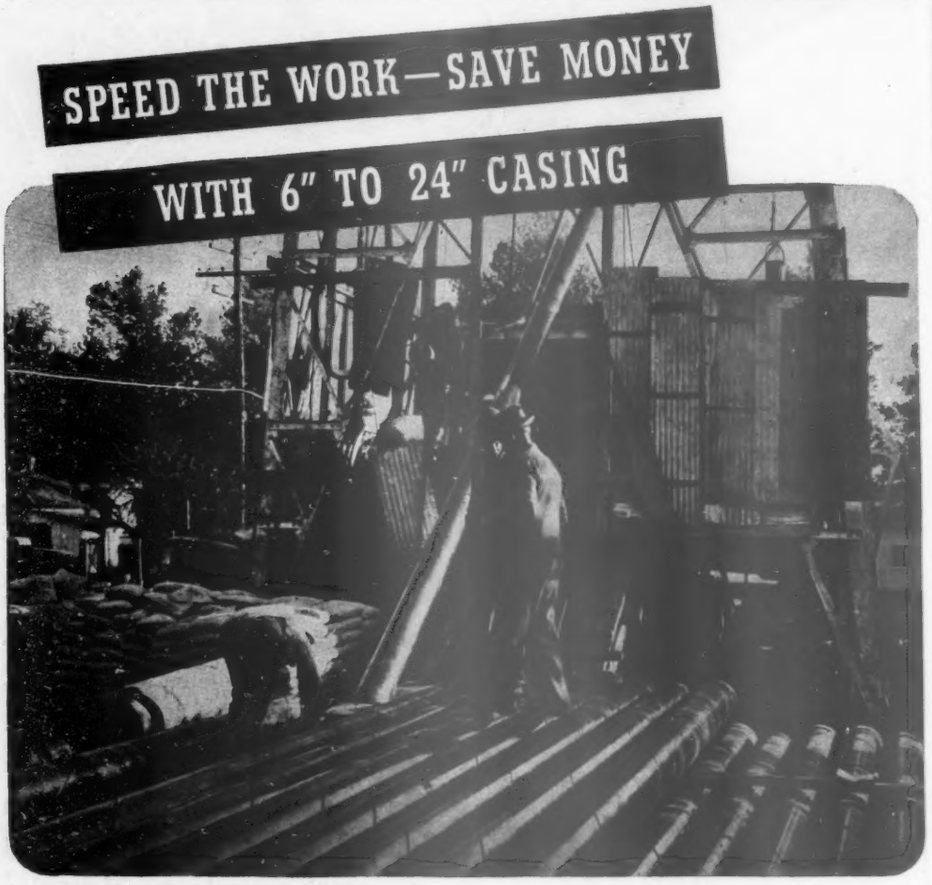
Port Barre, St. Landry Parish: Crosby Drilling Co. 7 Republic Production Co., 253 bbl., 9/64-in. choke, perf. casing 6,118-22 ft., T.D. 6,309 ft.

South Catahoula Lake, Rapides Parish: H. M. Marry et al 1 Eota Realty Co., 42 bbl. oil and 33 bbl. salt water, pumping, T.D. 7,078 ft., P.B. T.D. 5,165 ft.

Ville Platte, Evangeline Parish: Continental 2 Ed Tate, 232 bbl., 12/64-in. choke, perf. casing 10,010-40 ft., T.D. 10,225 ft.

Vermilion Bay, Iberia Parish: Texas 6-B State, 292 bbl., 9/64-in. choke, perf. casing 10,080-10,160 ft., T.D. 11,294 ft.

West Bay, Plaquemines Parish: Gulf 6-B Timolat, 244 bbl., 6/32-in. choke, perf. casing 7,296-7,306 ft., T.D. 7,416 ft.



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SOUTHWEST TEXAS

Gas-Distillate Production in Frio Found in Hidalgo County

By F. L. SINGLETON

CORPUS CHRISTI, Tex.—The chances for Frio-Vicksburg sand production in the Rio Grande Valley area were further enhanced the past week with the opening of gas-distillate production near the Rio Grande River in southwestern Hidalgo County. The discovery well, Arkansas Fuel Oil Co. 1 J. W. Heard was completed for an initial production of 10 to 12 bbl. of 56.6-gravity distillate and 1,250,000 cu. ft. of gas daily flowing through a 10/64-in. choke. Tubing pressure was 2,525 lb. Total depth of the well is 6,813 ft., and production is from perforated casing opposite sand at 6,020-26 ft. This is the most southerly production to be found along the trend. It is situated in Share 235, Los Ejidos grant and is on strike with other Frio-Vicksburg sand fields in eastern Starr County. In view of recent development which has converted other gas-distillate structures into important oil reserves, the new strike is being looked upon with considerable interest.

Updip from the above discovery, and located 2 miles southwest of the Orange Grove townsite, Plymouth 1 Kuck was shut down for orders after drill-stem testing through perforated casing at 3,672-78 ft. and 3,684-87 ft. showed meager results. Slight showings were also logged below 5,200 ft. and the section will probably be tested, although prospects of production are not encouraging.

On the northwest flank of the Sejita gas-distillate structure, Duval County, Trinity Gas Corp. 1 Garcia was reported to be flowing pipe-line oil and wash water while cleaning out through ¼-in. choke after perforating casing opposite oil sand in the Hockleyensis formation at 5,774-97 ft. The well topped the Jackson at 5,257 ft., and the Hockleyensis at 5,471 ft., and 5½-in. casing was cemented on bottom at 5,930 ft. This is the first oil production to be found on the structure which is being developed in conjunction with a recycling plant. The only other showing logged was a gas sand at 5,740-44 ft,, and while several sands were logged below the producing depth, all are reported to have carried salt water.

Pettus Sand Discovery in Bee County

Bee County had promise of another Pettus sand discovery as Shield Oil Co. 1 J. C. Wood, 2¾ miles southeast of the Heard field, in the G. Roach Survey, tested 600 lb. working pressure and recovered 10 ft. of mud on a 13-minute drill-stem test at 3,927-37 ft. The well is drilling ahead in shale below 4,375 ft. Two miles west of the Dirks field, Dirks Brothers are moving in material for a 4,400-ft. Pettus sand test to be drilled on the C. A. Dugat estate in the J. Poitevent Survey. The recent discovery of Carrizo sand production south of the Caesar field is being followed up with an active drilling campaign, and the potentiality of this undeveloped area is due to be determined at an early date. Locations for two offsets are reported to have been staked by George Strake in the T. Powell Survey. One mile south and the same distance northeast, two wells are being started by the Celtic Oil Co. and the Luling Oil & Gas Co. The acreage in the area is held by numerous independent and major companies who are supporting this development.

The new McLean field, Webb County, was assured of its second producer with the cementing of casing in Magnolia 1 McLean, a south offset to the discovery in Survey 121. Sand showing oil was cored in the discovery pay at 3,251-56 ft. the total depth, and casing is being cemented for testing following a 20-minute drill-stem test which recovered 1,850 ft. of pipe-line oil. In the meantime, O. W. Killam 2 McLean was swabbing oil after reperforating at 3,218-26 ft. while 1 mile east of the field, O. W. Killam 1 Garcia was abandoned at 3,465 ft. with no shows reported.

Another wildcat in the county was being watched with interest as O'Neil, Bedwell et al prepared to test 1 A. M. Bruni, located 8 miles west of the Glen field. Shaly sand with an oil odor was cored at 1,563-69 ft. and casing will be cemented for testing following a 30-minute drill-stem test which tested some working pressure and 40 ft. of drilling mud with a slight oil show.

Edwards Lime Test to Be Acidized

In the Balcones fault-line district, H. A. Pagenkopf was preparing to acidize 1 Ella Beel, a prospective Edwards lime pool opener, located 1 mile west of Sayersville in the A. B. Black Survey.

(Continued on Page 66)

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SPEEDS—SIMPLIFIES—AND PROTECTS A NATION'S DRAFTING

Gas Pay Logged in Test East Of Deep Emperor Pool

By TOM BARBER

MIDLAND, Tex.—In drilling at 3,005 ft. early this week, Ralph Lowe 1 Brown & Altman, Winkler County wildcat, found gas estimated at 5,000,000 cu. ft. daily. The gas sand was identified as the Colby sand. At 3,021 ft., 1 Brown & Altman obtained an increase in gas volume and an oil spray estimated at 25 bbl. daily.

As operator continued to drill deeper, oil increased at 3,046-48 ft., and oil and gas at 3.063 ft. and again at 3,083-90 ft. At last report the test sprayed 12 bbl. of oil in 2 hours.

No. 1 Brown & Altman is located in the SW SW SE Section 24, Block B-5, P.S.L. Survey. It is also 1½ miles northwest of the Weiner pool, which produces from the Keystone horizon, 1¼ miles east of the Deep Emperor pool, and 6 miles south of the Keystone area.

Wildcat in Ward County Prepares to Test

Three miles south of the Spencer pool in Ward County, Stanolind 1 Byrd, Section 34, Block 34, H.&T.C. Survey, is preparing to test at plugged-back depth of 2,801 ft. Operator drilled to 2,880 ft. and tested sulfur water on a 30-minute drill-stem test. The wildcat was then plugged back and 5½-in. casing set at 2,589 ft. A show of oil was encountered on a drill-stem test at 2,629-70 ft.

Shallow Noelke Field Well To Test Upper Show

In Crockett County, Moore & Olson 2-C Halff, Section 68, Block 1, H.&G.N. Survey, west of production in the shallow Noelke pool, has plugged back after failing to find production in the Ellenburger lime (Lower Ordovician) at 6,977 ft. No. 2-C Halff is now bottomed at 3,650 ft. and is making preparations to test a section of the Clearfork lime (lower Permian) at 3,623-46 ft.

SOUTHERN WEST TEXAS COMPLETIONS

(24-hour rating based on last 3 hours of 6-hour gage)

Fields

Abell, Pecos County: Stanolind 3 V. W. Crockett, elev. 2,392 ft., 1,820 bbl., ½-in. choke, pay 5,100-5,300 ft., top McKee sand 5,026 ft.

Fromme, Pecos County: W. H. Street 1-A Ed Fromme, elev. 2,408 ft., dry at 1,675 ft.

Foster, Ector County: Continental 8-B Johnson, elev. 2,967 ft., 307 bbl., 350-qt. shot 4,190-4,300 ft

Goldsmith, Ector County: Gulf 384 Goldsmith, elev. 3,209 ft., 737 bbl., 4,000 gal. acid 4,217-77 ft.

Keystone (Colby sand), Winkler County: Ralph Lowe 1-B Campbell, elev. 2,904 ft., 164 bbl., ¼-in. choke, 170-qt. shot 3,277-3,333 ft., T.D. 3,359 ft.

Sand Hills, Crane County: Gulf 3-B Todd, elev. 2,468 ft., 8,123 bbl., 5,000 gal. acid 5,640-64 ft., top Ellenburger 5,580 ft.

Shell 1 M. L. Barnsley, elev. 2,457 ft., 581 bbl. oil and 22 bbl. water, 40/64-in. choke, 7,000 gal. acid 4,174-4,252 ft., top Ellenburger 5,627 ft., T.D. 5,667 ft.

Scarborough, Winkler County: Richardson 10-F Scarborough, elev. 2,924 ft., 124 bbl., 1-in. choke, 220-qt. shot 2,830-2,981 ft.

Taylor Link, Pecos County: D. Breeding 8-J University, elev. 2,559 ft., 12 bbl. oil and 5 per cent water, pumping, 80-qt. shot 1,627-47 ft., T.D. 1,648 ft.

Wheat, Loving County: Standard 1 J. G. Allen, elev. 2,730 ft., 5 bbl., pumping, 110-qt. shot 4,316-62 ft., T.D. 4,368 ft., old well drilled deeper, old T.D. 4,315 ft.

NEW WILDCAT LOCATIONS

Pecos County: Anderson-Prichard 1 Charlotte Ogilvie, Sec. 30, Blk. 140, T.&P. Sur., NW NW of section, Ordovician test.

Anderson-Prichard 1 E. C. Powell, Sec. 98, Blk. 10, H.&C.N. Sur., 660 ft. from NW and SW lines of section, Ordovician test.

Iatan Field Extended to Northeast

The Iatan pool of Mitchell County was extended to the northeast this week with the completion of Standard of Texas 2 Foster, Section 7, Block 29, T.&P. Survey. On official Railroad Commission gage, the test flowed 645 bbl. of 31-gravity oil in 24 hours. No. 2 Foster is bottomed at 2,760 ft. Flow was through 4-in. opening on casing.

Two Outposts to Fullerton Area Under Way

Two outposts to the deep Permian lime discovery area in Andrews County are now under way. West offset to the discovery well is Fullerton Oil Co. 2 Wilson, which has drilled to 2,230 ft. No. 2 Wilson, located in Section 15, Block A-32, P.S.L. Survey, reported favorable structural position on the first marker encountered. The outpost logged the top of the anhydrite at 1,690 ft., 6 ft. higher structurally than 1 Wilson, the discovery well, which is in the process of completion.

Second west outpost is Magnolia 1 Ralph, located in the SE SE Section 11, Block A-37, P.S.L. Survey, ¾ mile west of the discovery well. No. 1 Ralph is rigging up.

In the meantime, Fullerton Oil Co. 1 Wilson is continuing to test. At last report, operator was swabbing acid residue after reperforating 5½-in. casing at 7,130-7,210 ft. and treating this upper section of the lower Permian lime with 1,500 gal. of acid. Previously, the main pay was treated with 1,500 gal. and 5,000 gal. of acid. The upper zone was acidized in an effort to increase gas volume.

On last gage reported, 1 Wilson flowed 173 bbl. of 41-gravity oil in 9 hours through ½-in. choke on tubing. Gas volume was estimated at 275,000 cu. ft. daily.

NORTHERN WEST TEXAS COMPLETIONS

(24-hour rating based on last 3 hours of 6-hour gage)

Fields

Sharon Ridge, Mitchell County: Magnolia 11 Foster, elev. 2,282 ft., 155 bbl. oil and 16 per cent water, pumping, 555-qt. shot 2,640-2,795 ft., T.D. 2,807 ft.

Standard 2 Foster, elev. 2,316 ft., 645 bbl., 4-in. casing outlet, 496-qt. shot 2,545-2,740 ft., T.D. 2,760 ft.

Slaughter, Cochran County: Devonian Oil 12-A Duggan, elev. 3,680 ft., 1,223 bbl., 12,500 gal. acid 4,950-5,026 ft.

Honolulu 35-5 Igoe & Smith, elev. 3,682 ft., 1,115 bbl., 2½-in. casing outlet, 10,000 gal. acid 4,940-5,025 ft.

Magnolia 10-A Mallett, elev. 3,649 ft., 911 bbl., 3-in. casing outlet, 10,500 gal. acid 4,950-5,019 ft.

Magnolia 14-A Mallett, elev. 3,649 ft., 1,992 bbl., 3-in. casing outlet, 10,500 gal. acid 4,970-5,049 ft.

Magnolia 16-A Mallett, elev. 3,641 ft., 1,756 bbl., 3-in. casing outlet, 10,500 gal. acid 4,975-5,050 ft.

Slaughter, Hockley County: Honolulu 12-A Mallett, elev. 3,577 ft., 1,344 bbl., 2½-in. casing outlet, 10,000 gal. acid 4,949-5,025 ft.

Magnolia 11-F Mallett, elev. 3,605 ft., 1,401 bbl., 3-in. casing outlet, 10,500 gal. acid 4,994-5,030 ft.

Magnolia 12-F Mallett, elev. 3,592 ft., 1,272 bbl., 3-in. casing outlet, 10,500 gal. acid 4,975-5,025 ft.

Stanolind 24-A Slaughter, elev. 3,522 ft., 845 bbl. oil and 8 per cent water, 2-in. casing outlet, 12,250 gal. acid 5,017-84 ft.

Texas Pacific Coal 6 Lauhoff, elev. 3,561 ft., 640 bbl., 3-in. casing outlet, 10,000 gal. acid 4,940-5,004 ft.

Wasson, Yoakum County: American Liberty 2 J. T. Herd, elev. 3,660 ft., 122 bbl. oil and 56 per cent water, 10,000 gal. acid 4,990-5,241 ft.

Gulf 3 Futch, elev. 3,638 ft., 475 bbl., ½-in. choke, 2,000 gal. acid 5,148-85 ft.

Humble 18 Randall, elev. 3,636 ft., 641 bbl., ¾-in. choke, 6,000 gal. acid, 5,020-5,125 ft., T.D. 5,148 ft.

TEXAS PANHANDLE

AMARILLO, Tex.—A total of 12 completions were recorded for the Panhandle district during the week, a drop from 17 the previous week. Of these, 11 were oil producers and one completed for gas. The gasser tested 260,000,000 cu. ft., by back-pressure method. The 11 oil producers had a total daily potential of 1,250 bbl.

There were only nine new locations made this week. One was a wildcat on the Matador ranch in Dickens County. Gray County counted with five new locations, while Hutchinson received three.

TEXAS PANHANDLE COMPLETIONS

Gray County: Cities Service 6 Worley, Sec. 63, Blk. 3, I.&G.N. Sur., 34 bbl., pay 3,020-48 ft., T.D. 3,075 ft.

Christie & Hickman 4 Gethings, Sec. 48, Blk. A-9, H.&G.N. Sur., 114 bbl., pumping, 970-qt. shot 2,725-2,833 ft.

Stanolind 4 Lovett, Sec. 36, Blk. B-2, H.&G.N. Sur., 317 bbl., pumping, 413-qt. shot 2,900-3,040 ft., T.D. 3,042 ft.

Texas 2 Benedict, Sec. 55, Blk. B-2, H.&G.N. Sur., 183 bbl., pumping, 405-qt. shot 3,035-3,108 ft., T.D. 3,110 ft.

F. H. Yealey 5 Crank, Sec. 163, Blk. 3, I.&G.N. Sur., 35 bbl., pumping, 860-qt. shot 3,178-3,280 ft.

Hutchinson County: Danube Oil Co. 13 Sanford, Sec. 78, Blk. 46, H.&T.C. Sur., 240 bbl., pay 2,818-36 ft.

Gulf 110 Dial, Sec. 90, Blk. Z, E.L. Sur., 84 bbl. oil and 50 bbl. water, pumping, 5,000 gal. acid 2,940-3,015 ft., T.D. 3,105 ft.

Stekol 45 Whittenburg, Sec. 89, Blk. Z, G.C.&S.F. Sur., 35 bbl., pumping, 120-qt. shot 2,995-3,160 ft., T.D. 3,165 ft.

Stekol 48 Whittenburg, Sec. 89, Blk. Z, E.L. Sur., 26 bbl., pay 2,955-3,150 ft., T.D. 3,158 ft.

Stekol 11 Perkins-Martin, Sec. 36, Blk. M-23, T.C. Sur., 48 bbl., pumping, 300-qt. shot 2,975-3,093 ft.

Texas 40 Lewis, Sec. 5, Blk. 23, B.S.&F. Sur., 134 bbl., pumping, 320-qt. shot 2,960-3,080 ft.

Moore County: Shamrock Oil & Gas Corp. 1 Johnson, Sec. 395, Blk. 44, H.&T.C. Sur., 260,000,000 cu. ft. gas, pay 2,960-3,265 ft., T.D. 3,517 ft.

Southwest Texas Fields

(Continued from Page 65)

Acid was being used after the hole was swabbed dry, showing a slight show of sulfur water and a rainbow of oil. Total depth is 3,150 ft., with 7-in. casing cemented at 3,102 ft.

One mile southwest of the Pearsall field, Frio County, Weigand Brothers 1 Gillam is reported to be swabbing at the rate of 40 bbl. per day from a crevice in the Taylor marl encountered from 4,871-90 ft.

SOUTHWEST TEXAS COMPLETIONS

LOWER GULF COAST DISTRICT

Wildcats

Bee County: W. E. Rowe 1 Stubenthal, dry, T.D. 5,010 ft.

Calhoun County: Amerada 1 State, dry, T.D. 8,949 ft.

Refugio County: Hewitt & Dougherty 5-A Rooke, dry, T.D. 7,020 ft.

San Patricio County: Henshaw Brothers 1 J. E. Smith, dry, T.D. 7,005 ft.

Fields

Agua Dulce, Nueces County: Richardson 6 Knight, 175 bbl., ¼-in. choke, perf. casing 7,096-7,119 ft., T.D. 7,146 ft.

Richardson 9 McCoy, 84 bbl., ⅛-in. choke, perf. casing 6,440-68 ft., T.D. 6,937 ft.

Ben Bolt, Jim Wells County: Bridwell Oil Co. 1-E Hoffman, 415,000 cu. ft. gas and 25 bbl. distillate, 3/32-in. choke, perf. casing 5,174-77 ft., T.D. 5,515 ft.

Clara Driscoll, Nueces County: Texas Conservative 9 Huie, 73 bbl., jetting, perf. casing 5,437-43 ft., T.D. 5,449 ft.

East Placedo, Victoria County: W. L. Goldston 1 M. P. R. R. Co., 105 bbl., 5/64-in. choke, perf. casing 6,865-67½ ft., T.D. 6,920 ft.

La Gloria, Jim Wells County: Magnolia 1 Burdett, 178 bbl., ¼-in. choke, perf. casing 6,698-6,701 ft., T.D. 6,703 ft.

North Keeran, Victoria County: Barnsdall 3-A Keeran, dry, T.D. 7,110 ft.

North Rincon, Starr County: Sun 3 Hall, 7,900,000 cu. ft. gas, open flow, perf. casing 4,592-4,607 ft., T.D. 5,123 ft.

Seeligson, Jim Wells County: Transwestern 1-A Seeligson, 37 bbl., 5/64-in. choke, 10 hr., perf. casing 5,950-55 ft., T.D. 5,990 ft.

Stratton, Kleberg County: Humble 6 King, 120 bbl., ⅛-in. choke, perf. casing 6,480-6,502 ft., T.D. 6,676 ft.

Stratton, Nueces County: Southern Minerals 35 Stratton, 86 bbl., 7/64-in. choke, perf. casing 6,478-88 ft., T.D. 6,678 ft.

Willamar, Willacy County: Pan American 1 Elliott, 86 bbl., 12 hr., 5/32-in. choke, perf. casing 7,839-44 ft., T.D. 7,970 ft.

LAREDO DISTRICT

Wildcats

Duval County: Bridwell 1-B Parr, dry, T.D. 4,465 ft.

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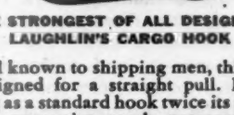

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Fields

Colorado, Jim Hogg County: Humble 55-B King, 194 bbl., 7/8-in. choke, T.D. 2,957 ft.

C. Andrade 4-A Trevino, 172 bbl., ¼-in. choke, sand 2,878-85 ft.

Glenn, Zapata County: Glenn Harroun 1 Hinnant, 204 bbl., 12 hr., ¼-in. choke, T.D. 2,171 ft.

South Campana, McMullen County: Argo 7-I Edrington, 121 bbl., open tubing, sand 3,043-48 ft.

Washburn, La Salle County: Quintana 6 Washburn, 422 bbl., ¼-in. choke, perf. casing 5,540-56 ft., T.D. 5,662 ft.

SOUTH CENTRAL TEXAS DISTRICT

Wildcats

Bexar County: Nick Morosis 1 McMonagle, dry, T.D. 775 ft.

Fields

Lentz, Bastrop County: Furlong & Thompson 4 Lentz, dry, T.D. 2,752 ft.

Extensive Activity in Western Canada Seen for Coming Year

(Continued from Page 61)

acidizing brought in bottom water.

The Ross Lake and Spring Coulee structures have been studied geophysically, but the prospective Madison formation is at much greater depths than in the Twin River or Del Bonita areas. The Cord firm's first test in the area was at Spring Coulee. The test reached a depth of 6,080 ft., obtaining no production but indicating that the limestone in this area has greater porosity and permeability than at the other locations where it had been drilled. New tests are planned for both structures with the coming of spring. Western Drilling Co., Ltd., is to test their holdings at Ross Lake while Paragon Oils, Ltd., makes a new Spring Coulee test.

Vermilion Field

Mr. Cord's Western Drilling Co., Ltd., is also developing a large tract in the Vermilion field, located 300 miles north of the southern Alberta prospective area. Late in the summer the company added a new well to the field's 10 producers. The well had an initial production of 125 bbl. of 15-gravity oil pumped from a depth of 1,835 ft. The field produces from a Cretaceous sand, and a problem arises from the fact that the oil reaching the surface contains much fine sand. The method being adopted for removing this sand is similar to that used in overcoming the same problem in some of the Rumanian fields. The heavy oil is simply pumped into surface pits, usually, about 30 by 60 ft. and 12 ft. deep, where the sand gradually settles out. Most of the pits are covered to protect the oil from volatilization, and more especially from the winter snows. Western Drilling Co.'s work in this area is under the superintendence of Frank McAteer, a Californian.

With comparatively small wells in a great area, one of western Canada's problems has always been the moving of crude from the more isolated locations to the refining and marketing centers. Trucks are widely used for moving oil where the production is insufficient to warrant pipe-line laying. With greater demand for oil, more intensive drilling in the semiproved areas should eventually serve to overcome the transportation problem in such districts.

California Fields

(Continued from Page 63)

6,249-63 ft., oil sand and gray sand 6,263-77 ft., bottomed in gray sand, tested wet.

Goleta wildcat district, Santa Barbara County: Del Mar Oil Co. 1 Goleta, 11-4n-28w, dry, T.D. 651 ft., abandoned in upper Vaqueros which consisted of gray sand and was barren.

Paso Robles wildcat district, San Luis Obispo County: Epco, Inc., 1 Paso Robles, 27-26s-13e, dry, T.D. 6,115 ft., several minor showings of oil and gas logged but no body of oil sand capable of producing was found.

Santa Maria Valley, Santa Barbara County: Bel-Air Oil Co. 2 Twitchell, 35-10n-34w, pumped 1,500 bbl., 13.1-gravity, 2 per cent cut, T.D. 5,358 ft., perf. 4,823-5,356 ft., completed in Monterey formation of Miocene age.

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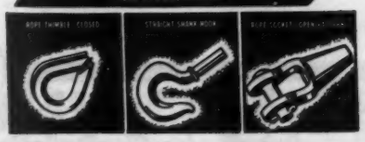

Smackover Lime Play Enters Northeastern Counties

By D. H. STORMONT

DALLAS, Tex.—With the usual shallow lime and 5,000-ft. Woodbine sand wildcat play throughout eastern Texas on a somewhat declining grade, news of the past week centered around four new wildcat projects to the deep zones of the district. All are apparently either a direct or indirect result of the deep Smackover lime discovery in Southwest Arkansas.

Both Bowie and Hunt counties have been given deep Smackover lime wildcats, while Bowie and Wood counties have received lower Trinity series operations. J. H. Coker of Dallas has assembled a 5,000-acre block 3 miles southeast of New Boston in Bowie County and is planning a Smackover lime test for the immediate future. The test is tentatively scheduled to be drilled in the J. Collum Survey, however the block embraces parts of the adjoining J. Paxton, G. W. Collum and Charles Cullom surveys. Starting date was not given.

In Hunt County Grady Vaughn is reported planning a Smackover lime operation southwest of Greenville and near Caddo Mills. It will be on a spread of leases around the M. Morris Survey. The block is still being enlarged with the test not scheduled for the immediate future.

Trinity Series Tests for Bowie and Wood Counties

Bowie County has been given a new Paluxy sand wildcat with the announcement of location of W. B. Hinton 1 J. L. Lumpkin. It will be 2,100 ft. from the east and 1,300 ft. from the south lines of the Wesley Byers Survey, 1½ miles northwest of Dalby Springs. Tools are already being moved to the drill site and contract depth is between 4,000 and 4,500 ft.

In Wood County a new Glen Rose lime wildcat has been staked in the Golden area. It will be Arthur Klemm 1 F. Ballard,, W. T. Marshall Survey on a 690-acre tract. It has been spudded and surface casing set at 209 ft.

East Texas Activity at New Low

A survey for the past month shows that general drilling activity for the district is at a new low point with only 28 operations in the entire district. Of this number, eight are wildcats, nine are in the Hawkins field and six are in the Chapel Hill field. Only about half of the 28 operations are actually in the active drilling state. The decline over the month previous was some 48 or from a total of 76 operations for that month. There was only one operation in the entire East Texas field and it was a shutdown rig in the Joiner area.

East Texas Operators Ask That Proposed Order Be Issued

Following the state-wide oil-proration hearing held in Austin on Monday, the group of East Texas operators sponsoring the field-wide return of salt water, asked the Railroad Commission to issue the order permitting closing of large salt-water wells and the transfer of bonus oil. At a hearing held about a month ago the operators asked that changes be made in the existing brine-disposal order to the effect that wells making over 100 bbl. of water daily could be closed in and their allowable produced by another well on the same lease; and that any bonus oil granted an operator for the return of brine could be produced on another lease or transferred to the brine-injection firm.

Need for the return of brine to the Woodbine producing sand is brought out by the rate of decline of bottom-hole pressure. The drop in pressure during the month of January was 15 lb. This is one of the largest pressure drops recorded in the field's history. With the trend in daily brine production continuing steadily upward, the necessity for returning the salt water is increasing in proportion.

NEW WILDCAT LOCATIONS

Nacogdoches County: Walsen Oil Co. 1 John C. Saner, Edgar Pollett Sur., 2 miles E of Caro, 470 ft. from E of SW line and 470 ft. from S line 160-ac. tract.

Wood County: A. R. Klemm 1 O. E. Bellamy, W. T. Marchell Sur., 1 mi. W of Golden, 660 ft. from S and W lines of 40-ac. tract out of NE cor. of survey, drilling 300 ft.

EAST TEXAS COMPLETIONS

Wildcats

Freestone County: Frank J. Gravis 1 J. L. Bonner, M. Anderson Sur., 7 mi. NW Fairfield, dry at 3,947 ft.

(Continued on Page 73)

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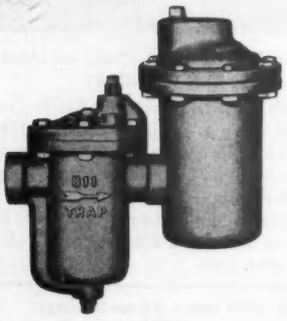

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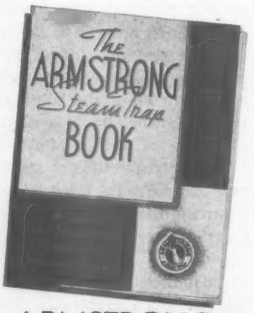

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Crosby, Harris County, Test Has Second Blowout Attempt

By NEIL WILLIAMS

HOUSTON, Tex.—Atlantic 1 Cohn, a wildcat located in the Crosby area, eastern Harris County, had another attempted blowout at a total depth of 8,820 ft., where drilling is temporarily halted. The well is reported to be bottomed in sand, topped at 8,816 ft., which is believed to be the lower Yegua. The well is located in the M. Duncan, just east of the Esperson dome where several wells on the east and southeast flanks are producing from the Yegua.

In Wharton County, Sinclair Prairie 1 Kubela, a semiwildcat located in the Hillje area, was preparing to retest after a small amount of gas-cut mud and 2,000 ft. of salt water was recovered on a drill-stem test through perforated casing at 5,203-17 ft. The well is located in the E.T.R.R. Survey 79, and was drilled to a total depth of 7,615 ft. before plugging back to 5,300 ft. to test sand at 5,200 ft. which is reported to have shown possible production in side-wall cores.

Two important semiwildcats located in Jackson County have reached critical stages. In the Texana area, Gulf 1 F. F. Wells was drilling in sandy shale below 5,204 ft. following a 10-minute drill-stem test at 5,106-10 ft. which recovered 1,650 ft. of salt water. In the Maurbro area, John Mayo et al 1 Reserve Realty Co. had reached a contract depth of 5,700 ft., and an electrical survey was being made. Thus far no shows of oil or gas have been reported.

Big Hill Flank Test Reports Shows

Stanolind 1 W. S. Davidson, a projected deep test located on the northwest flank of the Big Hill dome, Jefferson County, is drilling ahead in shale below 8,000 ft. and is reported to have logged sand sections showing oil and gas at intervals from 7,300 ft. to 7,500 ft. This is the second deep test to be drilled around the flanks of this old structure within recent weeks, being located several hundred feet from 1 G. A. Anderson which was completed for a gas well at 8,700 ft.

In the Bailey's Prairie area, Brazoria County, Glenn McCarthy 1 Munson is bottomed at 10,900 ft. and 7-in. casing was cemented at 10,900 ft. The casing is reported to have been set as a protection against high-pressure gas sands which are expected below 11,000 ft. The well is located several thousand feet from the operator's first test which produced for a short time from a depth below 10,000 ft. Contract for another Wilcox test to be drilled along the updip sector of the trend was let by H. C. Cockburn et al for 1 Gayle, a projected 7,500-ft. test located in the Plantersville area in the C. B. Stewart Survey. This is the third active Wilcox test for the county. Leasing and geophysical work has been showing an increase for the past several months, and this particular sector of the trend is in line for considerable wildcatting during the remainder of the year.

Recovery of pipe-line oil on a drill-stem test in Rowan & Nichols 1 Land, located south of the Anahuac field, Chambers County, encourages hopes that commercial oil production will be developed. The test was made through perforated casing at 9,045-47 ft. and the well flowed 8 bbl. of fluid per hour, of which 20 per cent was 38-gravity oil and the remainder salt water. The operators are attempting to cement off the salt water flow which is thought to be coming in at 9,037 ft.

TEXAS GULF COAST COMPLETIONS

Fields

Anahuac, Chambers County: Humble 42 Johnson, 33 bbl., ¼-in. choke, perf. casing 7,206-10 ft., T.D. 7,394 ft.

Boling, Wharton County: Danciger 1 Haves, 292 bbl., ¼-in. choke, perf. casing 3,103-13 ft., T.D. 3,163 ft.

Caplen, Galveston County: Snowden & Freedman 1 Simpton, 45 bbl., ⅛-in. choke, perf. casing 6,046-66 ft., T.D. 6,301 ft.

Fannett, Jefferson County: Gulf 1 Hampshire, dry, T.D. 9,034 ft.

Fig Ridge, Chambers County: Sun 1-A Acom, 489 bbl., ¼-in. choke, perf. casing 8,514-29 ft., T.D. 8,547 ft.

Sun 2 Smith, 183 bbl., ⅛-in. choke, perf. casing 8,468-95 ft., T.D. 8,602 ft.

Ganado, Jackson County: Texas 7 Mortgage Land & Investment Co., 160 bbl., ⅛-in. choke, perf. casing 6,420-30 ft., T.D. 6,689 ft.

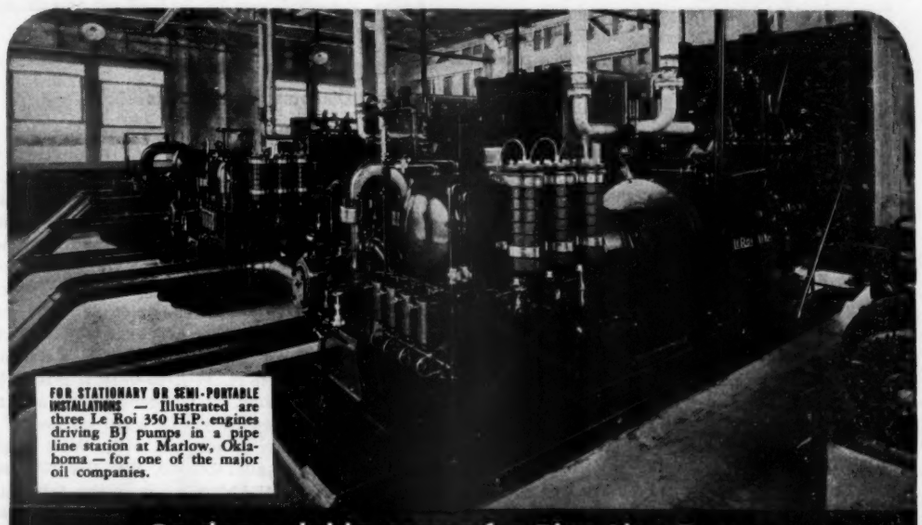
Pure 2 Weise, 54 bbl., ⅛-in. choke, perf. casing 5,734-50 ft., T.D. 6,262 ft.

Hilje, Wharton County: Texas 1 Stovall, 42 bbl. oil and 42 bbl. salt water, 9/64-in. choke, perf. casing 5,226-31 ft., T.D. 5,242 ft.

Lolita, Jackson County: Magnolia 9 Four Way Ranch, 154 bbl., 7/64-in. choke, perf. casing 6,402-05 ft., T.D. 6,407 ft.

Markham, Hamill & Hamill 3 Hudson, dry, T.D. 2,732 ft.

(Continued on Page 78)



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Fourth Pool Opener in Peace Creek Trend Is Completed

By ROBERT INGRAM

IN common with all other parts of the country, drilling in Kansas has been sharply curtailed. Added to the complications set up by 40-acre spacing, operators fear further cuts in production because of the OPC announcement that state allocations would be based on estimated reserves as well as on market demand.

Reports from the 52 wildcats drilling or completed show little of interest. During the week 11 were completed, of which only 1 was a producer. This was Hinkle and Central's Schweizer pool opener which made 258 bbl. of oil and 10 bbl. of water in 8 hours. This marks the fourth discovery along the Peace Creek Viola trend play, the others being Peace Creek, Northeast Peace Creek and Hendrickson. The four pools are on a line 6 miles long and some or all of them may ultimately merge.

Viola Yields Gas in Barber County Test

Champlin's Barber County wildcat, 1 Hildebrand, E½ NE NW 26-32s-15w, tested the Viola last week, getting a fair gas yield. Top of the Arbuckle was 5,185 ft. and the well was drilled to 5,323 ft. It was then plugged back and two tests were made in the lower section of the Viola. The first at 5,028 ft. got no shows and the second at 5,035-42 ft. got a hole full of water. The well was then plugged back to 4,944 ft. and a test at 4,925-30 ft. showed about 6,000,000 cu. ft. of gas. Perforations from 4,935-40 ft. increased the yield to 8,000,000 cu. ft. of gas, but the well is spraying water as well.

New Pool Opened West of Abbyville

About 4 miles west of the Abbyville pool in Reno County, Cities Service 1 Morton, SW SW NE 17-24s-8w, is showing up as a pool opener. Top of the Arbuckle was logged at 3,876 ft. and after coring fair porosity with a sulfur odor at 3,905-10 ft. the well was plugged back and perforated in the Kansas City-Lansing at 3,402-08 ft., 3,439-50 ft. and 3,500-11 ft. After acidizing the well pumped 61 bbl. of oil and 10 bbl. of water in 8 hours. Potential was 185 bbl. of oil and 32 bbl. of water.

Pawnee County Wildcat Shows Discouraging Results

In southern Pawnee County, Stanolind is still trying to make a well out of its 1 R. Smith, N½ SE SE 16-23s-16w. Arbuckle lime was topped at 4,066 ft. and gas was picked up at 4,106-12 ft. After acidizing, the well made 1,152,000 cu. ft. The well was deepened in several stages to 4,132 ft. and additional acid treatments brought the production up to 8 bbl. of fluid an hour, 50 per cent of which was water and 15,000,000 cu. ft. of gas. The gas was killed and the hole reacidized and made 1,000,000 cu. ft. of gas and 25 gal. of water an hour from 4,132-32½ ft. At 4,145-46 ft. it made 7½ bbl. of fluid an hour, 23 per cent water, and at 4,148-50 ft., it flowed 75 bbl. of water an hour.

In Barton County an outpost to the West Kraft pool, Luther Mackall 1 Disque, NW NW NW 23-17s-11w, swabbed 47 bbl. of oil from the Arbuckle at 3,313-18½ ft. Top of the lime was reported at 3,301 ft.

KANSAS COMPLETIONS

Wildcats

Barber County: Pryor & Lockhart 1 Riepe, SW SW SE 13-31-14w, dry, T.D. 4,586 ft., Topeka 2,820 ft., Lansing 3,737 ft., show oil 3,849-56 ft., Mississippi lime 4,258 ft., base Mississippi 4,289 ft., Viola 4,341-4,468 ft., Simpson 4,477 ft., Arbuckle 4,570-86 ft.

Barton County: Helmerich & Payne 1 Teichman, C E½ SE NE 12-20-13w, dry, T.D. 3,511 ft., Topeka 2,880 ft., Lansing 3,211 ft., conglomerate 3,441 ft., Arbuckle 3,470 ft.

Cowley County: Oil Interest, Inc., 1 Poovey, NW NW SE 7-32-3, dry, T.D. 3,200 ft., Bartlesville 3,094 ft., Mississippi lime 3,144 ft., show oil 3,143-52 ft., 3,177-80 ft.

Dickinson County: Nelson Drlg. 1 Will, SE SE NE 8-16-4, dry, T.D. 2,233 ft., Lansing 1,880 ft., Mississippi lime 2,212 ft., show oil 2,212-20 ft.

Leavenworth County: McLaughlin 1 Miller, C NE SE 22-10-20, dry, T.D. 1,947 ft., Lansing 414 ft., Bartlesville 1,437-56 ft., Mississippi lime 1,476 ft., Hunton 1,872 ft.

Reno County: Hinkle Oil and Central Pet. 1 Schweizer, SE SE NW 31-22-9w, pumped 258 bbl. 8 hr., 42.5 gravity, cherty dolomite, Topeka 2,730 ft., Lansing 3,200 ft., Misener 3,675 ft., Viola 3,702 ft., T.D. 3,725 ft. *Discovery of Schweizer pool.*

Rice County: Ingling & Parker 1 Christensen, C E½ SW SW 26-18-7w, dry, T.D. 3,522 ft., Lansing 2,765 ft., base Kansas City 3,093 ft., sandy conglomerate 3,158 ft., Viola 3,371 ft., Simpson 3,400 ft., Arbuckle 3,460 ft.

Rooks County: Stanolind 1 Boller, C W½ NE NW 32-8-16w, dry, T.D. 3,565 ft., Topeka 2,840 ft., Lansing 3,079 ft., show oil 3,104-07 ft., 3,200-02 ft., Arbuckle 3,441 ft.

Russell County: B. & R. Drilling 1 Ira, NE NE SE 13-12-11w, dry, T.D. 3,426 ft., Topeka 2,820 ft., Lansing 3,041 ft., Simpson 3,369 ft., Arbuckle, 3,413-26 ft.

Stafford County: Veeder Supply 1 Eriksen, C S½ SE NE 3-22-11w, dry, T.D. 3,611 ft., Topeka 2,710 ft., Lansing 3,171 ft., base Kansas City 3,445 ft., sandy conglomerate 3,461 ft., cherty conglomerate 3,478 ft., Viola 3,497 ft., Simpson 3,519 ft., Arbuckle 3,581 ft.

Stanton County: Helmerich & Payne 1 Bitner, C SE 16-30-42w, abandoned location.

Fields

Ainsworth, Barton County: Simpson Oil 1 Reif, W½ SW NW 1-17-13w, dry, T.D. 3,409 ft.

West Ainsworth, Barton County: Vernon Oil & Gas 1 C. C. Pelz, NW SW NW 4-17-13w, dry, T.D. 3,394 ft.

Aldrich, Ness County: Continental 2 Olson, SW NE SE 5-18-25w, dry, T.D. 4,344 ft.

Beaver, Barton County: Bay Petroleum 1 Reimann, NW NW SE 22-16-12w, potential 250 bbl., Gorham sand 3,361 ft., T.D. 3,370 ft.

Bedford, Stafford County: British American 6 Meyer, SE SE NE 28-23-12w, potential 3,000 bbl., Arbuckle 3,819 ft., T.D. 3,843 ft.

Bemis, Ellis County: Cities Service 11 Colahan-B, NE SW SW 25-11-17w, potential 451 bbl., Arbuckle 3,524-30 ft., T.D. 3,575 ft.

Brandt, Butler County: Adair & Morton 5 Cannon, SE SW NW 15-28-7e, dry, T.D. 3,090 ft.

Chase, Rice County: Derby Oil and E. K. Carey 1 Emerick, E½ NE SW 19-19-9w, pumped 45 bbl., Arbuckle 3,274½ ft., T.D. 3,282½ ft.

Dayton, Phillips County: Carter 1 E. C. Garber, NW SW 36-2-19w, 2,064 bbl., Lansing 3,128 ft., T.D. 3,323 ft.

Eldorado, Butler County: Cities Service 212 Wilson, NW NE SW 8-25-5e, pumped 8 bbl., Burlingame 8.9-50 ft., T.D. 859 ft.

Gorham, Russell County: Central Petroleum 3 Rouback-B, E½ NE SE 15-14-15w, potential 248 bbl., Gorham sand 3,221 ft., T.D. 3,224 ft.

Greenvale, Russell County: Cities Service 4 Schartz, S½ NE NE 5-15-12w, potential 785 bbl., Gorham sand 3,182 ft., T.D. 3,189 ft.

Hall-Gurney, Russell County: J. J. Hall 3 L. Miller, NW SW NW 31-14-13w, potential 1,250 bbl., Gorham sand 3,127-31 ft., T.D. 3,131 ft.

Keesling, Rice County: Bay Petroleum 1 De Witt, W½ NW SE 9-20-9w, potential 544 bbl., Arbuckle 3,238 ft., T.D. 3,255 ft.

McLouth, Jefferson County: Hatcher-Fisk 1 Woodhead, SW SW 29-9-20e, location abandoned.

Ray Anderson 2 McLeod-Wisdom, NW NW 29-9-20e, gaged 1,500,000 cu. ft. gas, Bartlesville, T.D. 1,473 ft.

Hatcher-Fisk 1 Black, NE SE 30-9-20e, dry, T.D. 1,687 ft.

Gordon and Pool et al 2 Knudsen, NE NW 33-9-20e, dry, T.D. 1,606 ft.

Sherrod 1 Benne, NW NW NE 8-10-20e, dry, T.D. 450 ft.

Williams and Hicks 1 Robert Herries, NE NW NE 8-10-20e, dry, T.D. 516 ft.

McLouth, Jefferson County: O. J. Connell 2 Edmonds, NW NE 21-9s-20e, 5,000,000 cu. ft. gas, Bartlesville 1,421 ft., T.D. 1,530 ft.

Ray Anderson 2 McLeod-Wisdom, NW NW 29-9s-20e, 1,500,000 cu. ft. gas, Bartlesville 1,466-73 ft.

E. H. Hatcher 1 James A. Black, NE SE 30-9s-20e, dry, Bartlesville 1,503-09 ft., Mississippi lime 1,516 ft., slight show oil, T.D. 1,687 ft.

Moore, Butler County: Ralph Wixson 7 Dohran, E½ NE NE 11-25-3e, pumped 10 bbl., Mississippi lime 2,645 ft., T.D. 2,685 ft.

Peace Creek, Reno County: Cities Service 2 Kreie-D, NE SE SW 21-23-10w, potential 3,000 bbl., Viola 3,763 ft., T.D. 3,777 ft.

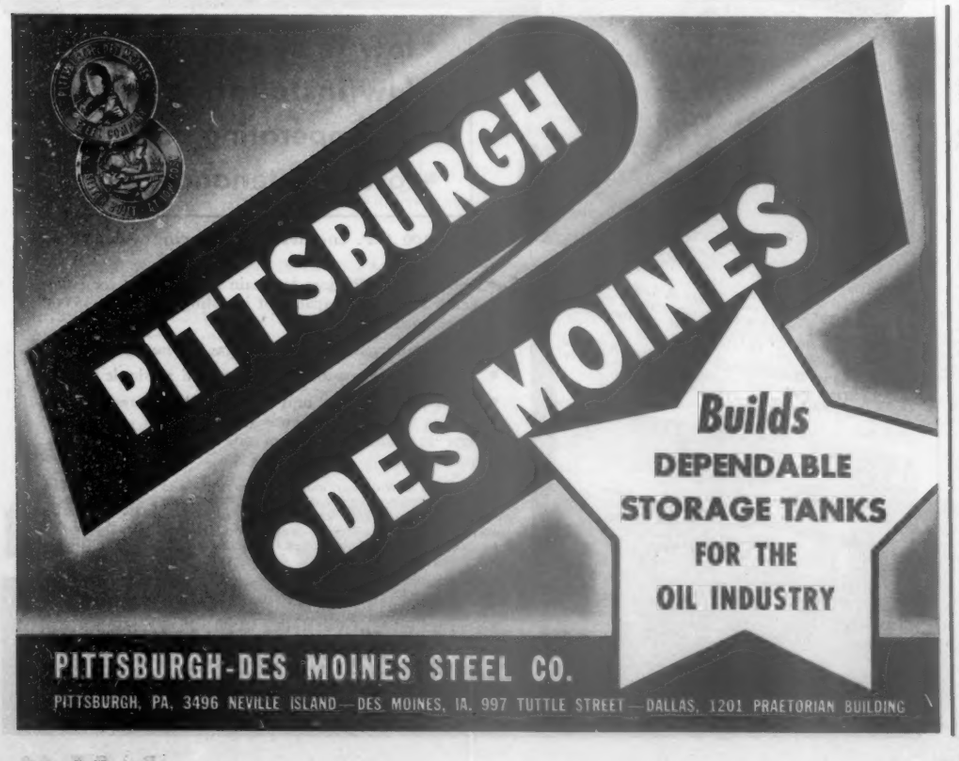
Raymond, Rice County: Anderson-Prichard 2 Yeo, N½ NW NW 29-20-10w, location abandoned.

West Silica, Barton County: Frank Hollow 1 Scheufler, NE NE NE 19-20-11w, pumped 75 bbl., Arbuckle 3,310 ft., T.D. 3,344 ft.

Stafford, Stafford County: Continental Oil 1 Cooper, N½ NW NE 22-24-12w, dry, T.D. 4,084 ft.

Trapp, Russell County: Central Petroleum 1 Anschutz, SW NW NW 10-15-13w, potential 3,000 bbl., Lansing 3,033 ft., T.D. 3,081 ft.

(Continued on Page 78)



Greene County Test Has Oil In Dunkard Sand

PITTSBURGH, Pa. — Highlights in the lower eastern fields for the past week are the location for two Oriskany tests in West Virginia, and the opening of a new Dunkard sand oil producer which may extend an old field. Total completions for the week are the lowest in several years which reflects the operation of Order M-68, and forecasts possibly even lower total completions if the order is not revoked or drastically modified. The new Dunkard sand oil well in Greene County, Pennsylvania, is being tested. If it holds up even as a small producer it would normally be offset, even though smaller wells resulted as the Dunkard sand is long lived. The spacing under M-68, however, makes further development hazardous.

SOUTHWEST PENNSYLVANIA

In Greene County, Natural Gas Co. of West Virginia ran casing to 6,787 ft. in the wildcat on the Andrew Workman farm on the Washington anticline in Richhill Township. The Onondaga lime was topped at 6,757 ft. This test will be closely watched as it is the first deep test in Greene County or on this structure.

The other deep test of great interest, that of the Peoples Natural Gas Co., on the Jacobs Oil Co. lease on the Fayette anticline in South Huntington Township, Fayette County, set a whipstock in the Onondaga chert at 7,475 ft. and is drilling by the tools lost on account of broken jars. With reasonable success, the Oriskany may be reached within the week.

In Greene County, several very fair gas wells have been completed in the Big Injun sand in Monongahela Township in what appears to be a southwest extension of the Big Injun gas in Menallen, German, and Nicholson townships, Fayette County. Several of these had shows of oil in the Dunkard sand. On the Tony Ritz farm, Homer Antill et al, in drilling a test for Big Injun gas, struck the Dunkard sand at 605 ft. and at 620 ft. shut down on account of oil. It has produced as high as 40 bbl. in a day and may be completed as an oil well. It is about 13,000 ft. east of the nearest oil in the old Willow Tree field and which has produced for decades.

COMPLETIONS

Clarion County, Porter Township: McNutt & Stahlman 1 J. D. Henry, 14,000 cu. ft. gas, Speechley 2,362-2,402 ft., gas 2,365 ft., T.D. 2,801 ft.

Greene County, Monongahela Township: Wahler-Powers Oil & Gas Co. 1 Harry Pritts, dry, through Fifth sand, T.D. 2,832 ft.

Washington County, West Bethlehem Township: Manufacturers Light & Heat Co. 1 E. and L. Moore, dry, through Fifth sand, T.D. 3,087 ft.

WEST VIRGINIA

Additional deep tests, one of which is a distinct wildcat, have been staked in West Virginia. In Freemans Creek district, Lewis County, Hope Natural Gas Co. will drill to the Oriskany on the J. B. Lovett farm about 1¼ miles due east of its rotary test on the Alfred Woofter farm which was completed as a commercial though not large gas well in the Oriskany sand. It is about 1¼ miles southeast of Freemansburg, and is on the west flank of Chestnut Ridge. Elevation is 1,186 ft.

In Ritchie County, heretofore untested in the deep sands, Benedum & Trees have a location for an Oriskany test on the L. J. Rinehart 98 acres, mapped as Cornielia Storrs farm, located about 1½ miles southwest of the town of Goose Creek. It is on the west flank of the Wick anticline.

In Kanawha County, South Penn Natural Gas Co. completed the 3 Ray-Salyers in Poca district, at 1,670 ft. in the Big lime and it is showing for 50 to 100 bbl. a day. This is a southern extension of the pool on the Homer C. Jones farm. The second east offset on the J. A. Wines farm completed by the Virginian Gasoline & Oil Corp. was acidized which increased production from 15 bbl. a day to 150 bbl. from the Big lime, depth 1,572 ft.

WEST VIRGINIA COMPLETIONS

Boone County, Washington district: Hope 8582 H. Nunnencamp, 10 bbl. and 100,000 cu. ft. gas, Big lime 1,683-1,875 ft., Big Injun 1,875-1,939 ft., Berea 2,283-2,414 ft., T.D. 2,441 ft.

Braxton County, Birch district: Pittsburgh & West Virginia 7822 Walter H. Herold, dry, Big lime 1,619-1,707 ft., Big Injun 1,707-1,865 ft., T.D. 2,523 ft.

Otter district: Pittsburgh & West Virginia 7825 G. B. Howell, 1,100,000 cu. ft. gas, Salt sand 1,770-1,811 ft., gas 1,798-1,810 ft., T.D. 1,811 ft.

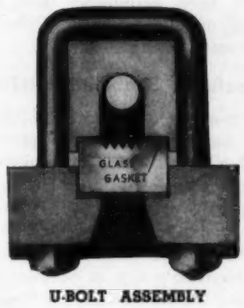
Calhoun County, Sherman district: Hope 8592 J. B. Huffman, 197,000 cu. ft. gas, Injun sand, T.D. 2,159 ft.

Clay County, Henry district: Virginian Gasoline & Oil Co. 1315 Brown, Swann & Goshorn, 4 bbl., Big lime 1,744-1,871 ft., Injun 1,871-1,911 ft., oil 1,885-1,911 ft., T.D. 1,913 ft.

Ritchie County, Murphy district: H. M. Wilson 25 Colonial Asphalt Co., 1 bbl. and 20,000 cu. ft. gas, Maxton sand 1,784 ft., T.D. 1,849 ft.

(Continued on Page 78)

The U-Bolt Assembly with Alloy and Forged Steel Parts gives Strength to . . .



U-BOLT ASSEMBLY

JERGUSON

Reflex Gages

NO one questions the sure visibility provided by the Reflex type of gage. The other important factors are design and materials of construction. Jerguson Gages provide the best there is in gages and too much emphasis cannot be given to the strong U-Bolt assembly shown above. It's a feature of Jerguson Gages and fits them admirably for handling the high pressures often encountered in refinery circles. In fact, standard units are built for 3200 pounds pressure.

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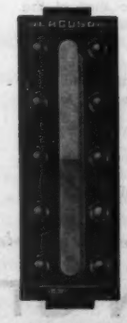
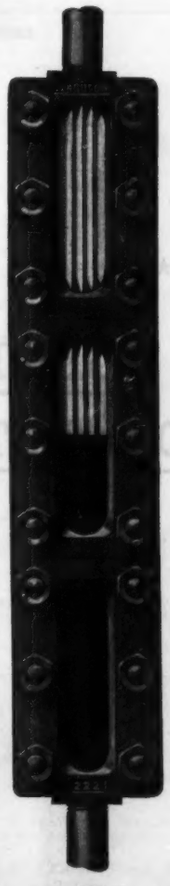
The Jerguson Transparent Gage is ideal where the color or density of liquid must be noted. It, too, is sturdily constructed but having glass on both sides of the liquid chamber necessitates the Thru-Bolt rather than U-Bolt construction.



TRANSPARENT GAGE



REFLEX GAGE

JERGUSON GAGE & VALVE CO.

85 Fellsway Somerville, Mass.

2-JV-3

OKLAHOMA FIELD REPORT

Production Drop Coupled With Withdrawals From Storage

By ROBERT INGRAM

WITH drilling reduced to a minimum despite the fact that completions are keeping up, Oklahoma operators stood on the sidelines while the Corporation Commission battled with OPC over the proposal to allocate production to the various states on the basis of reserves. In addition to its arguments against the proposal, the commission had as confirmation of its stand that Oklahoma should be permitted to produce at its former level, the fact that 1,650,000 bbl. of crude have been withdrawn from storage within the state during January while other areas were adding to storage.

Results in Scattered Wildcats

Prospects for a new field on the south end of the Apache trend appear poor as Texas 1 Reich, NW NW NE 25-4-11w, recovered fresh water and only a stain of oil on a swabbing test at 2,485 ft. Originally drilled to 3,493 ft. in the lower Simpson, the well was plugged back to its present depth. It is shut down for orders.

Champlin's test in southwestern Grant County logged the Dense at 6,600 ft., dolomite at 6,610 ft. and first Wilcox at 6,650 ft. At latest report, it was drilling at 6,675 ft. with 1,000 ft. of water in the hole.

In Texas County and south of the Hugoton area, Panhandle Eastern Gas Co. 1 Walker, NE 25-3n-15ecm, got a show of gas at 2,644 ft. and an increase at 2,727 ft. From pay at 2,644-2,773 ft., it produced 4,800,000 cu. ft. of gas with a rock pressure of 430 lb.

OKLAHOMA COMPLETIONS

Wildcats

Kay County: Ingling & Parker 1 School, SW NE 36-25-1w, flowed 68 bbl., Hoover sand 2,020-25 ft. T.D. 2,616 ft.

Okfuskee County: Allen 1 Camp, SE NE SW 18-11-9, dry, T.D. 4,020 ft., Booch 3,055 ft., Gilcrease 3,219 ft., Cromwell 3,425-88 ft., Hunton 3,946 ft.

Payne County: Oklahoma Gaso. Plants 2 South Minnich, NE SE NE 3-18-6, flowed 100 bbl., Burgess sand 3,240-48 ft., T.D.; Prue 2,720-60 ft., Skinner 2,890-2,925 ft.

Seminole County: Palmer 1 Humphrey, SW NW NE 15-6-5, flowed 165 bbl. 37 gravity, Senora sand 2,826-42 ft. Hogshooter 1,417 ft., Checkerboard 1,778 ft., Wewoka 1,860 ft., Earlsboro 3,895 ft., T.D. 3,230 ft.

Stephens County: Winkler & Wrightsmith 1 Clark, NE SW SW 36-2s-6w, dry, T.D. 1,897 ft., Arbuckle lime 1,832 ft.

Fields

Beebe, Pottawatomie County: Champlin 2 Walker, NW cor. 16-5-5, pumped 10 bbl., T.D. 2,550 ft.

Cement, Caddo County: Magnolia 16 McKenna, NE NE SE 11-5-9w, abandoned location.

Chandler, Lincoln County: Jones Associates 1 Lockhart, SW NW SE 17-14-4, dry, T.D. 5,125 ft.

Deaner, Okfuskee County: Champlin 3 Lewis, SE cor. 15-11-11, old T.D. 2,725 ft. Pumped 14 bbl., Viola 3,425-74 ft.

Dilworth, Kay County: West Virginia Oil & Gas 7 Fox, SE SW NE 19-28-1, pumped 25 bbl., sand 3,358-3,370 ft.

Garber, Garfield County: Champlin 1-B Hayes, NW NE SW 30-23-3w, 4,000,000 cu. ft. gas, chat 5,019-69 ft.

Guthrie, Logan County: McBride 7 Eastwood, NE NW SW 7-17-1w, flowed 450 bbl., Bartlesville 5,070-95 ft.

Hewitt, Carter County: Gibson-Jennings 4 Hoover, NE SW SE 20-4s-2w, pumped 150 bbl., 2,965-95 ft., T.D. 3,300 ft.

Hobart, Kiowa County: Sherman 2 Kelsey, SW NE SW 20-7-17w, abandoned location.

East Hominy, Osage County: P. J. McIntyre 7 Osage, SE NE SW 31-22-9, water disposal well, T.D. 600 ft.

Hotulke, Pottawatomie County: Ohio 1 Meyer, NW NE NW 21-9-4, dry, T.D. 4,530 ft.

West Hotulke, Pottawatomie County: Ohio 1 Billington, NW SW SE 22-9-4, pumped 20 bbl., Sylvan 4,405-22 ft., T.D. 4,665 ft.

Mervine, Kay County: McClung 2 Murdock, SW SW SW 2-27-3, dry, T.D. 2,032 ft.

Mounds, Okmulgee County: Pure Oil 9 Boling, NW NW NE 21-17-12, old T.D. 1,535 ft., reworked. Pumped 3 bbl. Glenn sand 1,490-1,553 ft., T.D. 1,563 ft.

Oklahoma City, Oklahoma County: Big Chief 2 Cook-Smith, NE SW SW 22-12-3w, pumped 281 bbl., Wilcox 6,466-6,542 ft.

Phillips 7 Sawyer, NW NE NE 22-12-3w, dry, T.D. 6,614 ft., Cromwell 4,054 ft.

Okmulgee, Okmulgee County: Deaner 1 Rinegar, NW SW NW 36-14-12, dry, T.D. 2,007 ft.

Pollyanna, Okmulgee County: Standard Drlg. 1-A Gouseth, SW NW NW 17-15-12, dry, T.D. 2,662 ft.

St. Louis, Pottawatomie County: Kosmos Oil 2 Milburn, SW NE NW 15-7-4, pumped 250 bbl., dolomite 4,202-52 ft., T.D.

C. Andrade 1 McElroy, NE SE NE 28-8-4, flowed 384 bbl., Hunton 3,888-3,943 ft.

Wildhorse, Osage County: Trinity Oil 2 Osage, NW NE SE 15-22-10, dry, T.D. 1,825 ft.

Miscellaneous

Jefferson County: Jack H. Martin 1 Bounds, SW NW SW 13-6s-6w, dry, T.D. 1,876 ft.

Okmulgee County: A. J. Hazlett 12 Ashley, NW SE NW 29-14-14, pumped 10 bbl., Booch 1,254-69 ft., T.D.

Osage County: Texas 2 Osage, NW SW SE 9-23-7, water-disposal well, T.D. 3,112 ft.

Pottawatomie County: E. N. Jordon 1 Jackson, SE SW NE 20-6-5, dry, T.D. 2,895 ft.

Stephens County: Mid-Continent 1 Baker, NW SE NE 35-2s-6w, flowed 217 bbl., Arbuckle lime 1,760-71 ft., T.D. 1,830 ft.

Tulsa County: T. E. Turner 3-A Hagle, SE NE NE 11-16-12, dry, T.D. 2,417 ft.

A SUBSTITUTE FOR BUTANE

Some time ago when we began work on a substitute for butane that could be used in existing butane gas systems, we did not realize then that its need might be so near.

We are glad we are now in position to assure the many thousands who are so vitally concerned that a new method and substitute fuel for continuing existing butane gas systems in service is ready. The method will be known and licensed under the trade symbol "VX", and here is further data about this substitute which will be of interest to butane dealers and consumers:

ADAPTABILITY:
VX blend was developed primarily for existing domestic butane gas systems, but will serve many commercial and industrial butane consumers equally as well.

AVAILABILITY:
Components of VX blend are available in ample quantities and are not in large demand for military uses.

VAPOR PRESSURE:
The vapor pressure of VX blend as used in butane gas systems is comparable to that of the ordinary butane-propane mixes commonly used.

CONVERSION:
Ordinarily, no new equipment is required to convert a butane gas system from butane to VX blend.

APPLIANCES:
Appliances designed to burn butane gas perform even more satisfactorily with VX blend.

CONDENSATION:
VX blend is safer than butane or butane-propane mixes, because condensation occurs at lower than ordinary operating temperatures.

DISTILLATION:
Fractional distillation occurring in the use of VX blend is less than occurs in the commonly used butane-propane mixes, hence even better performance in appliances.

DISTRIBUTION:
Dealers' motor transportation and bulk storage facilities, in most instances, will require some modifications.

COST:
The cost of fuel by the VX method, depending upon market conditions, may be expected to compare favorably with prevailing costs of butane-propane mixes.

Liquefied Petroleum Gas Division

SOUTHERN STEEL COMPANY

SAN ANTONIO, TEXAS

NORTH CENTRAL TEXAS

Show Logged in Strawn Sand West of Worsham Field

By D. H. STORMONT

WICHITA FALLS, Tex.—West of the Worsham area in Clay County, Gulf 6 Worshaw, Section 37, Block 4, H.&T.C. Survey, logged an oil show in the Strawn series early in the week. Saturated sandy lime was topped at 5,281 ft. and, as operator drilled ahead, sand with a show of oil was recovered in a core taken from 5,288-5,306 ft. At last report, the well was drilling below 5,375 ft. with no additional shows reported. Location is 8 miles north of Bellevue in the eastern part of the county.

Jack County Prospect Continues to Swab

Operator is continuing to swab at Joe Worsham 1 Sewell, perspective Caddo lime wildcat, 8 miles southeast of Jacksboro in the Crenshaw Survey. Swabbing is recovering fluid at the rate of 6 bbl. hourly, mostly wash water with some new oil. No. 1 Sewell has been deepened 10 ft. after 5½-in. casing was set at 4,693 ft., on top of the Caddo lime, and is now bottomed at 4,717 ft. It is reported that considerable swabbing will be necessary to clean out hole. A large amount of water was injected into the test to kill an oil fillup before casing was set. The wildcat filled 2,500 ft. with oil in 3 hours before casing was set.

Sullivan 1 McCoy Reperforated

The Foard County wildcat being drilled by Bruce Sullivan at 1 McCoy, Seaton Survey, 4 miles south of Crowell, was reperforated early this week at 5,580-86 ft. Previously casing was perforated at 5,592-5,600 ft. and formation treated with 1,000 gal. of acid. Only a slight amount of oil was recovered at this depth so operator decided to reperforate. At last report 1 McCoy had swabbed 1 bbl. of fluid per hour for 36 hours. The fluid consisted of oil and fresh water.

Archer County Wildcat Drills Ahead After Test

Sinclair Prairie 1 Coleman, Brazos C.S.L. Survey, 5 miles north of Scotland in Archer County, is drilling below 5,602 ft. in what is believed to be the Mississippian. Previously, the wildcat had recovered 35 ft. of oil-cut mud on a drill-stem test from 5,384-5,405 ft. The test also recovered oil-cut mud on a test of the upper section of the Caddo lime.

NORTH TEXAS COMPLETIONS

Wildcats

Clay County: F. H. Gohlke 2 Paul Bibrey, Sec. 27, Pratts pasture subd., dry at 1,194 ft.

Bridwell Oil Co. 17 H. C. Edrington, Sec. 37, H.&T.B. Sur., A-229, dry at 1,648 ft., top Fusulina 1,246 ft.

Young County: Panhandle Ref. Co. 1 Harrell, G. N. Smith Sur., A-254, dry at 3,570 ft., top Caddo 3,558 ft.

Fields

Bowers, Montague County: Ross Drilling Co. 1-B First National Bank of St. Jo., J. L. Graham Sur., A-295, 83 bbl. in 24 hr., pumping, pay 3,797-3,834 ft.

Briar, Young County: Panhandle, Rankin & Fagahau 4 Mary Harlon, F. Jaime Sur., A-157, 4,340,000 cu. ft. gas, pay 2,739-48 ft., T.D. 2,749 ft.

Clingingsmith, Montague County: Sinclair 2 J. P. Clingingsmith, Sec. 149, J. H. Belcher Sur., 225 bbl. in 3 hr., est. 250 bbl., 1,500 gal. acid 5,940-57 ft., top Caddo 5,012 ft.

Cooke, Cooke County: Trumter Petroleum Corp. 15-B C. E. Stacey, J. Clark Sur., A-194, 40 bbl. in 24 hr., pumping, pay 752-65 ft.

Halsell, Clay County: Bridwell Oil Co. 9-A Ford Halsell, Sec. 8, H. P. Belcher Sur., A-843, dry at 5,935 ft., top Caddo 5,388 ft., top dolomite 5,666 ft.

Hults-Owen, Montague County: Hults & Owen 1-A J. A. Brite, Sec. 2820, T.E.&L. Sur., 143 bbl. in 24 hr., ¾-in. choke, est. 600 bbl., top Caddo 6,030 ft., pay 6,031-58 ft.

K.M.A., Wichita County: Buffalo Oil Co. 10 W. P. Ferguson, Sec. 8, W. H. Spillers Sur., A-257, dry at 1,520 ft.

Wilbarger, Wilbarger County: W. H. Peckham 1 W. T. Waggoner, Sec. 49, Blk. 4, H.&T.C. Sur., dry at 1,950 ft.

Miscellaneous

Archer County: Pace Oil Co. 32-B C. L. Abercrombie, Sec. 156, Harris subd. of Club ranch, 9 bbl. in 24 hr., pumping, top Gunsight 1,161 ft., pay 1,163-72 ft.

Rancho Oil Co. 1-B H. O. Prideaux, Sec. 23, John Dorsey Sur., A-122, dry at 698 ft.

Clay County: Staley Oil Co. 8 E. H. Hamilton, Sec. 83, Byers Bros. subd., 41 bbl. oil and 4 bbl. water, pumping, pay 1,115-23 ft., T.D. 1,125 ft.

A. P. Kouri 1-45 C. T. Taylor, Sec. 45, Bacon's subd., 100 bbl. in 24 hr., pumping, pay 1,136-43 ft.

Johnson & Kouri 11 C. T. Taylor, Sec. 56, Bacon's subd., 36 bbl. in 24 hr., pumping, pay 1,118-40 ft.

L. T. Burns 1 C. L. Wynn, Sec. 34, Williams Sur., A-704, 247 bbl. in 6 hr., ¼-in. choke, est. 650 bbl., 4,000 gal. acid 5,905-6,063 ft., top Ellenburger 6,070 ft., top Mississippi 5,905 ft., T.D. 6,088 ft., old well drilled deeper.

Wichita County: Dinsmore & Stipe 1 H. R. Knotts, Sec. 223, Waggoner Colony subd., dry at 1,137 ft.

Westbrook Oil Corp. 5-B L. R. Ramming, Henry Hastie Sur., A-92, dry at 1,292 ft.

K. D. Harmon 1 E. Sherrod, Sec. 3, Denton C.S.L. Sur., A-417, dry at 1,835 ft.

Young County: Cato 5-B G. B. Hamilton, Sec. 1393, T.E.&L. Sur., dry at 961 ft.

S. D. Glover 31 C. W. Johnson, Lot 9, E. W. Sergent Sur., A-253, 6 bbl. in 24 hr., pumping, top Gunsight 567 ft., pay 575-91 ft.

Seth Cockerell 1 Dan Johnson, Sec. 25, T.E.&L. Sur., A-301, dry at 765 ft., top Gunsight 686 ft.

E. W. Production Co. 2 H. E. Brown, Sec. 624, T.E. &L. Sur., top Marble Falls 4,370 ft., top Chappell lime 4,936 ft., dry at 4,957 ft.

T. D. Humphrey 1 T. C. Butler, Sec. 462, T.E.&L. Sur., dry at 4,890 ft.

Mid-Continent Petroleum Corp. 6-A Grimshaw, J. E. Powdle Sur., A-2250, 193 bbl., 42/64-in. choke, est. 500 bbl., 1,500 gal. acid 3,970-4,013 ft., top Palo Pinto 1,190 ft.

NEW WILDCAT LOCATIONS

Clay County: W. A. Spradling 1 J. P. Sunday, 375 ft. from W and 510 ft. from S lines of W. P. Sunday 201.4-ac. tract, A. McGown Sur., A-319, 1,150-ft. rotary test.

Bridwell Oil Co. 18 H. C. Edrington, 50 ft. from S and 1,650 ft. from W lines, Sec. 35, H.&T.B. Sur., A-759, 1,600-ft. rotary test.

Akin, Dimock & Costley 2 R. E. Huff, 700 ft. from N and 1,150 ft. from W lines of NE cor. of J. Bradshaw Sur., A-17, 1,350-ft. rotary test.

Cooke County: W. F. Russell 1 M. Gwyn, C NW SW H. Jennings Sur., A-531, 1,500-ft. rotary test.

Montague County: A. A. Basse 1 L. B. Parker, NW NW L. B. Parker 73-ac. tract, S. H. Smith Sur., A-662, 6,300-ft. rotary test.

A. A. Basse 1 W. B. Parker, NE NE W. B. Parker 100-ac. tract, S. H. Smith Sur., A-662, 6,300-ft. rotary test.

Young County: N. B. Dollins 1 H. F. Haygood, 150 ft. from E and 550 ft. from S lines of H. F. Haygood 80-ac. tract, Sec. 1466, T.E.&L. Sur., A-892, 800-ft. cable-tool test.

Wimberly Pool Extended Again, Possibly in Two Directions

FORT WORTH, Tex.—A new west extension and a possible south extension for the Wimberly pool of Jones County, together with favorable shows at wildcat tests in Jones and Throckmorton counties, were reported last week in the West Central Texas area.

The Wimberly pool, discovered over a year ago, is one of the best discoveries of the past 2-year period. The nineteenth oil producer was completed the past week from the lowest of the field's six producing horizons. Drilling was started in the area on a 20-acre spacing pattern. However, the new 40-acre spacing is not expected to entirely stop activity, since at only one point on the south end is the field defined. Edge wells staked on the 40-acre plan will still be attractive to the field's operators.

The new producer this week is Fain-McGaha Oil 1 David Tarpley, in the NE cor. of Block 104, which was gaged at 187 bbl. hourly for 4 hours. Pay was from the lower lime at 2,325-35 ft., total depth. This is the farthest-west producer for the field, although several locations have been staked outside of this well. A new south outpost producer was seen the past week when the Butler & Horne Drilling Co. 1 Fikes, S½ Block 89, found saturation in the lower pay zone and started flowing oil. The hole filled with oil in 30 minutes and made several heads before being closed in for running of oil string. Casing will be set at 2,358 ft. for completion attempts this week.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Brown County: J. C. Hamer 1-A J. H. Morgan, 200 ft. from N and E lines of NW¼ Sec. 32, B.B.B.&C. Sur., dry at 853 ft.

Eastland County: L. A. Thompson 1 A. E. Fox, Lot 49, Lge. 3 and 4, McLennan C.S.L. Sur., A-364, dry at 1,480 ft.

Jones County: Merry Bros. & Perini 1 A. H. Lundgren, Sec. 20, H.&T.C. Sur., Blk. 3, dry at 3,376 ft.

Petroleum Producers Co. 1 George Walker, Sec. 46, Blk. 16, T.&P. Sur., 8 bbl. in 24 hr., pumping, pay 1,763-65 ft., T.D. 2,003 ft.

Shackelford County: E. C. Lawson 1 J. H. Reeves, Sec. 14, Blk. 3, H.&T.C. Sur., dry at 3,267 ft., top Palo Pinto 3,196 ft.

B. & F. Bonded Warehouse 1 W. J. Johnson, 833 ft. from SE and 4,900 ft. from SW lines Sec. 489, T.E.&L. Sur., dry at 873 ft.

Kittery Oil Co. 1-A T. G. Hendrick, A.B.&M. Sur. 1, 2,000,000 cu. ft. gas, pay 1,614-20 ft., T.D. 1,822 ft., semiwildcat.

C. J. Kleiner 1-A Dawson-Conway, Sec. 146, E.T. Sur., 66 bbl. in 24 hr., pumping, pay 1,427-35 ft., T.D. 1,441 ft.

R. H. Roark 1-A J. H. Elliott, Sec. 9, L.A.L. Sur., 6,500,000 cu. ft. gas, pay 2,878-89 ft., T.D. 2,910 ft., old well drilled deeper.

Fields

Stephens, Stephens County: F. H. E. Oil Co. 3 J. Q. Corbett, Sec. 2, A. W. Corbett Sur., A-1971, 201 bbl. in 21 hr., 5/32-in. choke, pay 3,983-86 ft.

F. H. E. Oil Co. 1 A. Klore, Sec. 3, S.P. Sur., Blk. 3, 6 bbl. in 24 hr., pay 4,029-34 ft., T.D. 4,105 ft.

Wimberly, Jones County: W. D. Brookover 2 W. C. Church, Lot 88, Godwin subd. of De Witt C.S.L. Sur. 126, 177 bbl. in 7 hr., est. 400 bbl., pay 2,292-2,340 ft.

NEW WILDCAT LOCATIONS

Comanche County: L. B. Tannehill 1 Terrill heirs, 883 ft. from NW and 2,700 ft. from SW lines Swanson Yarberry Sur., A-1035, 1,500-ft. cable-tool test.

Jones County: Carl S. Shoults 1 Seth Alston, 660 ft. from S and 2,310 ft. from E lines Sec. 7, H.&T.C. Sur., Blk. 3, 3,500-ft. rotary test.

McCulloch County: Homer Easterwood 1 W. C. Johnson, 660 ft. from S and W lines of NW¼ Nevendorf Sur. 1355, 2 mi. SW of Salt Gap, 2,250-ft. rotary test.

Eastern Texas

(Continued from Page 68)

Houston County: Lone Star Gasoline Co. 1 Ford Newman, J. D. J. Procilla Sur., 90,000,000 cu. ft. gas, T.D. 5,947 ft.

Leon County: Geier Bros. and Jackson 1 C. W. De Vaugh, 1½ mi. NW Navarro, 930 ft. from SE and 467 ft. from SW lines William Little Sur., dry at 5,828 ft., top Austin 5,170 ft., top Woodbine 5,772 ft.

Fields

Chapel Hill, Smith County: Chapel Hill Gas System 1 I. E. Gilliam, A. Harris Sur., 312 bbl. in 24 hr., 4,000 gal. acid 8,045-8,116 ft., top Austin 3,818 ft.

Hawkins, Wood County: E. B. German 1 C. B. of Missions, William Butcher Sur., 163 bbl. in 18 hr., ¼-in. choke, top Austin 4,300 ft., top Woodbine 4,556 ft., pay 4,716-48 ft., T.D. 4,800 ft.

Humble 5-B L. A. Bryan estate, M. A. Esparcia Sur., 103 bbl. in 6 hr., ¼-in. choke, top Austin 4,198 ft., top Woodbine 4,400 ft., pay 4,571-4,876 ft.

Humble 2-B E. M. Faulk, William Herrington Sur., 92 bbl. in 6 hr., ¼-in. choke, top Austin 4,307 ft., top Woodbine 4,607 ft., pay 4,738-78 ft., T.D. 4,887 ft.

Humble 2 B. C. Wyatt, William Herrington Sur., 103 bbl. in 24 hr., ¼-in. choke, top Austin 4,314 ft., top Woodbine 4,636 ft., pay 4,756-4,859 ft., T.D. 4,886 ft.

Texas 3 J. O. Cobb, H. F. Robinson Sur., 96 bbl. in 8 hr., top Austin 4,318 ft., top Woodbine 4,509 ft., pay 4,654-4,789 ft., T.D. 4,823 ft.

Long Lake, Freestone County: Carter-Gragg Oil Co. 2 J. L. Johnston, Hety Wheeler Sur., 61 bbl. in 24 hr., 6/64-in. choke, T.D. 5,319 ft.

Pittsburg, Camp County: Gulf 1 Curtis Stewart, G. W. Lewis Sur., 109 bbl. in 24 hr., pumping, T.D. 8,551 ft.

West Cut Bank Outpost Gets Good Flow in Sunburst

By T. R. INGRAM

DENVER, Colo.—Another flowing well in the Sunburst sand on the west side of the Cut Bank field in Montana was completed in Santa Rita Oil & Gas Co. 16 Tribal, which flowed and swabbed 587 bbl. the first 24 hours. This well is in a district where anything may be expected from dry holes to big gassers and is 4 miles north of Santa Rita 1 Lander, the record well for the field, also a Sunburst sand producer. It is a northwest offset to same company's 15 Tribal, which made 468 bbl. initially last December from the Sunburst, and a west offset to A. B. Cobb 1 Jeffries-Stufft, which made 150 bbl. initial in the Sunburst. The Sunburst was dry in several holes between this area and the district to the east although some of these wells were good producers in the Cut Bank.

Southwest Lance Creek Test Dry in Leo

Cow Gulch Oil Co. 1 Nelson, C SE SW 19-35n-65w, a wildcat on the Southwest Lance Creek structure, had the top of the Leo at 6,344 ft. and drilled to 6,550 ft. In a drill-stem test with packer set at 6,510 ft. and open 20 minutes it showed 14 ft. of clear water. Packer then was set at 6,364 ft. in first Leo and it failed to show any fluid. It was then plugged back to 5,200 ft. in the 7-in. and will perforate and again test the Sundance sand.

COLORADO COMPLETIONS

Kit Carson district, Cheyenne County: O. E. Terry 1 Whitson, NW NW SE 12-13s-49w, T.D. 4,819 ft., water in Marmaton sand, top 4,810 ft., top Pennsylvanian 4,220 ft., elev. 4,491 ft., plugged and abandoned.

WYOMING COMPLETIONS

O'Brien Springs, Carbon County: Continental Oil 1 Johnson, SE SE SW 1-24n-88w, T.D. 5,021 ft., in very hard Tensleep sand, top 4,944 ft., plugged and abandoned.

Wertz field, Carbon County: Sinclair-Wyoming 25-A Wertz, NW SE SW 6-26n-89w, T.D. 6,374 ft., swabbed 150 bbl. first 24 hr. from Tensleep, top 6,034 ft., after acidizing.

MONTANA COMPLETIONS

Bowdoin field, Valley County: Montana-Dakota Utilities 668 Hight, C NW NW 12-31n-34e, T.D. 850 ft., 517,000 cu. ft. of gas, R.P. 220 lb.

Cut Bank field, Glacier County: Santa Rita Oil & Gas 3 Jacobson, C SE SW 7-33n-5w, T.D. 3,043 ft., 7-in. 3,004 ft., Sunburst sand 2,935-55 ft., show oil 2,945-55 ft., Cut Bank 2,990-3,019 ft., main pay 3,010-19 ft., swabbed 150 bbl. first 24 hr.

Santa Rita 16 Tribal, NE SW NE 3-35n-6w, T.D. 3,015 ft., 7-in. 2,976 ft., Sunburst sand 2,975-3,014 ft., main pay 2,989-3,014 ft., flowed by heads, swabbed and flowed 587 bbl. first 24 hr., 422 bbl. second period.

Kevin-Sunburst field, Toole County: Rimrock Oil 8 Schmidt, SE SE NW 29-35n-3w, T.D. 1,777 ft., contact 1,770-77 ft., acidized 500 gal., averaged 25 bbl. oil and 25 bbl. water on 10-day test.

Prevol & Shay 1 Government, CEL SW SW 11-35n-3w, T.D. 1,828 ft., contact 1,824-26 ft., acidized 500 gal., averaged 25 bbl. daily, 10-day test on pump.

Coolidge & Coolidge 9-A State, SW SE NW 36-36n-2w, T.D. 1,605 ft., averaged 50 bbl. daily on pump 10-day test from Sunburst sand at 1,562-1,605 ft.

NORTHWEST NEW MEXICO COMPLETIONS

Barker dome, San Juan County: Southern Union Production 1 Ute Indian, NE NW NW 21-32n-14w, T.D. 2,490 ft., 5,000,000 cu. ft. gas from top of Dakota after shutting off bottom water.

Show Reported in Madison

Big West Oil Co. 1 State, C SE 6-34n-4w, between the Cut Bank and Kevin-Sunburst fields, which showed for 2,125,000 cu. ft. of gas in the Sunburst and Cut Bank sands and then was carried on down to test the Madison, was drilled to 2,295 ft., and had the top of the Madison at 2,825 ft. It had a show of oil at 2,290-95 ft., and preparations are being made to acidize and test. It is ¾ mile southeast of 1 Dahlquist, the discovery well, which was completed as a gasser in the Cut Bank.

Montana Production Record

The Montana Oil Conservation Board in its annual analysis of production in that state reports a total for 1941 of 7,517,560 bbl., an increase of 820,823 bbl. over 1940. Shipments of crude to Canada were 91,977 bbl., a decrease of 379,920 bbl. as compared to 1940. Shipments to other states were 1,048,553 bbl., an increase of 92,890 bbl. Crude refined in Montana aggregated 6,064,180 bbl., as compared with 5,537,612 bbl. in 1940. an increase of 526,568 bbl. Oil in storage on December 31, 1941, was 1,376,533 bbl. as against 1,105,279 bbl. at the end of 1940, an increase of 271,254 bbl. Wyoming oil refined in Montana was

(Continued on Page 80)

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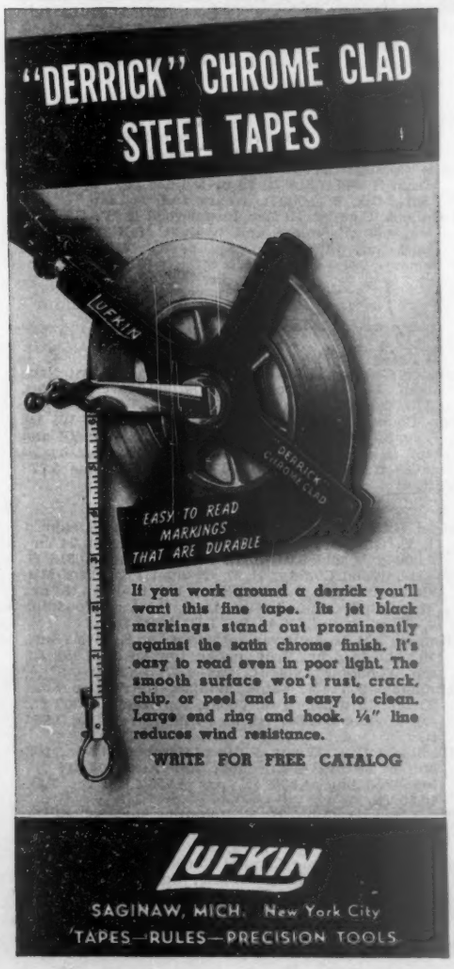
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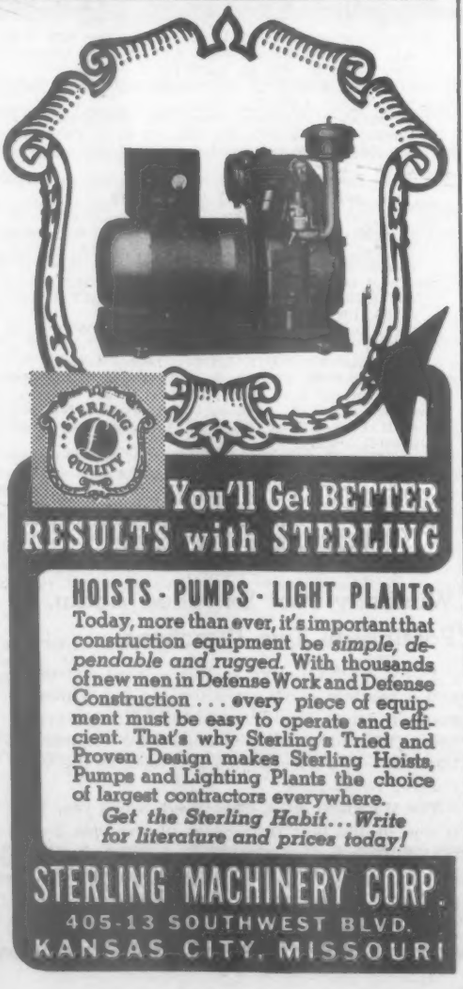
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ILLINOIS FIELD REPORT

Six New Pools in Prospect In Different Sectors

MATTOON, Ill.—Federal drilling restrictions and winter weather have reduced Illinois operations and completions to such a point that they are at their lowest ebb since 1937. A recent survey of operations in the state shows that of 219 total operations on February 1, only 34 were drilling wells while 153 tests had rigs standing, 12 were rigging up and 20 were new locations. This represents a decrease of exactly 50 per cent of the 438 total operations under way when the federal drilling regulations were put in effect December 23. Of the 438 operations at that time 93 were drilling wells, 275 had rigs standing, 20 were rigging up and 50 were new locations. A total of 20 wells were completed last week as compared to 65 during the third week of December of last year. This is a decrease of nearly 70 per cent in total weekly completions.

On the brighter side, however, are the reports which indicate that wildcat operators are meeting with unusual success in their search for new oil areas. With wildcat ventures in Illinois almost as numerous as drilling operations in established pools, six areas in the southern part of the state had prospects of new oil pools last week end.

Richland Wildcat Makes Good Flow

Topping the wildcat completions was the Bonpas Development Co. 2 Woods, W½ SW SE 21-2n-14w, Richland County test which flowed 1,090 bbl. of oil in an initial test of the McClosky after an acid treatment. Previous to the acid the well swabbed at the rate of 250 bbl. daily from a saturated section encountered at 3,090-96 ft. No. 2 Woods is only 1½ miles east of the Parkersburg pool of Richland and Edwards counties but is separated from that pool by two dry holes.

Edwards County was also assured of a new pool last week with the recovery of saturation in the Aux Vases sand at Taylor 1 Ogle, S½ SE SW 30-1s-11e. The saturated zone was encountered at 3,055-74 ft. and after plug was drilled oil entered the hole at the rate of 200 ft. an hour. No. 1 Ogle is northeast of Albion and approximately midway between the Albion and Bone Gap pools.

Several Wildcats Showing Oil

Cameron Oil Co. 1 Landwehr, a wildcat in NW NW NE 8-5n-7e, was coring Bethel sand at last reports after finding a fair show of oil in the Weiler. No. 1 Landwehr topped the Weiler 2,501 ft. and on a core at 2,505-19 ft. recovered 1½ ft. of bleeding, oil-saturated sand and 3½ ft. of shale. On a 30-minute drill-stem test at 2,505 ft., 240 ft. of oil and gas-cut mud were recovered. The test is about 12 miles north of nearest production in the Sailor Springs pool.

Perry County, which has no production, moved into the limelight last week when saturation was encountered in the Weiler sand at the Harsh 1 Newborn, SE SE NW 22-4s-1w. Casing has been set and operators are fighting mud in an attempt to move in equipment to test the saturation at 1,127-50 ft. Perry County now has four active wildcats, more than at any other time since large scale exploration was revived in the state in 1937.

Clinton County was also back in the oil picture after several weeks when Jack Daniel 1 Laux, SE SE 6-3n-2w, found saturation in the Benoist sand at 1,144 ft.

The other prospective pool opener of the week was Johnson 1 Black & Ward, W½ NE NE 14-5n-9e, Jasper County. At last reports operators were beginning a test of McClosky lime saturation. No. 1 Black is about 2 miles west of the Dundas Consolidated pool.

Wildcats

Jackson County: Glenwood 2 Truax-Traer Coal, E½ SE NE 24-7s-2w, dry at 2,200 ft., Glen Dean 1,550 ft., Golconda 1,670 ft., Barlow 1,855 ft., Cypress sand 1,860 ft., Paint Creek sand 1,905 ft., Benoist 1,950 ft., Renault 1,965 ft., Aux Vases 1,990 ft., Ste. Genevieve 2,038 ft., Rosiclare 2,062 ft., Fredonia 2,105 ft., McClosky 2,120 ft.

Wayne County: R. S. Hayes 1 G. Townes, E½ SE NE 18-1n-7e, dry at 3,290 ft., Glen Dean 2,602 ft., Golconda 2,704 ft., Barlow 2,808 ft., Renault 3,078 ft., Aux Vases 3,091 ft., Ste. Genevieve 3,161 ft., Rosiclare 3,210 ft., McClosky 3,232 ft., St. Louis 3,266 ft.

White County: Joe Dawson 1 H. L. Clark, NW SW NE 36-5s-10e, pumped 23 bbl. oil and 3 bbl. water, 60-qt. shot 2,962-77 ft., perf. 2,823-47 ft., Aux Vases sand 2,955 ft., T.D. 2,981 ft., P.B. 2,978 ft.

Fields

Dale, Hamilton County: Carter 3 C. Johnson, NW SW SE 12-6s-6e, pumped and flowed 346 bbl., 20-qt. shot 3,061-67 ft., Aux Vases sand 3,061-67 ft., T.D. 3,071 ft.

Dundas, Jasper County: Pure 1-H Kasserman, E½ SE SW 19-5n-10e, flowed 149 bbl., 5,000 gal. acid, Fredonia 2,847 ft., pay 2,860-67 ft., T.D. 2,887 ft.

Inman, Gallatin County: Buell & Herndon 5 Egyptian T. & T., NE SW SE 16-8s-10e, pumped 8 bbl., 20-qt. shot 2,422-31 ft., 2-qt. shot 2,430-31 ft., Cypress sand 2,419 ft., T.D. 2,435 ft.

Johnsonville, Wayne County: Wiser 7 A. A. Watson E½ NW NE 34-1n-6e, pumped 125 bbl., 40-qt. shot 2,946-51 ft., Aux Vases sand 2,944-51 ft., T.D. 2,952 ft.

Shell 1-B Weaver, W½ NW NE 1-1s-6e, pumped 330 bbl. from Aux Vases and Levias, perf. 3,244-52 ft., 3,224-30 ft., 3,166-74 ft., 3,154-63 ft., 1,000 gal. acid, 1,500 gal. reacid, 7-qt. shot 3,083-88 ft., Aux Vases 3,072-92 ft., Levias 3,164-68 ft., T.D. 3,270 ft., P.B. 3,233 ft.

Shell 1 Weaver, NE NE NW 1-1s-6e, pumped 311 bbl. from Aux Vases and Levias, perf. 3,149-64 ft., 1,000 gal. acid, perf. 3,188-3,204 ft., 3,247-52 ft., 3,225-52 ft., 10-qt. shot 3,077-84 ft., Aux Vases sand 3,070-97 ft., Levias 3,147-63 ft., T.D. 3,268 ft., P.B. 3,175 ft.

Carter 1 Love, W½ NW NW 3-1s-6e, pumped 55 bbl. from Aux Vases and McClosky, perf. 3,906-27 ft., old well worked over, T.D. 3,223 ft.

Carter 2 Love, SW NE NE NE 4-1s-6e, pumped 220 bbl. from Aux Vases and McClosky, perf. 3,012-24 ft., old well worked over, T.D. 3,225 ft.

Louden, Fayette County: Magnolia 41 T. C. Clow, N½ 5-7n-3e, pumped 10 bbl. oil and 20 bbl. water in 20 hr., 60-qt. shot 1,516-56 ft., 20-qt. shot 1,450-60 ft., Benoist 1,530 ft., T.D. 3,200 ft.

Carter 24-5 E. T. Dragoo, SE SE NE 23-8n-3e, input well, Glen Dean 1,349 ft., Cypress 1,482 ft., Cpyress sand 1,504 ft., T.D. 1,548 ft.

Maunie South, White County: S. C. Yingling et al 2-B Karch, NW NE SW 24-6s-10e, pumped 12 bbl. oil and 14 bbl. water, Palestine sand 2,012-27 ft., T.D. 2,216 ft., P.B. 2,016 ft.

S. C. Yingling 5-A H. Karch, SE SW NE 24-6s-10e, dry at 1,980 ft.

New Harmony, White County: Superior 21 H. C. Ford et al, NW SE SE 5-5s-14w, pumped 21 bbl., 110-qt. shot 2,851-75 ft., 300-qt. shot 2,850-65 ft., perf. 2,586-2,600 ft., Cypress sand 2,588-2,602 ft., Aux Vases 2,850-65 ft., T.D. 2,875 ft.

Roland, White County: Duncan & Ledbetter 1 M. Powell, NW NW SE 1-7s-8e, pumped 3 bbl., 60-qt. shot 2,919-43 ft., Aux Vases 2,913-34 ft., T.D. 2,943 ft.

Rural Hill, Hamilton County: Ohio 1 O. C. Smith, NW SE NW 24-6s-5e, pumped 110 bbl., 270-qt. shot 3,088-3,111 ft., Aux Vases sand 3,100-09 ft., T.D. 3,263 ft., P.B. 3,118 ft.

Kewanee-Shell 1 Culivar, E½ SE SW 14-6s-5e, flowed 141 bbl., perf. 3,148-70 ft., 2,000 gal. acid, Aux Vases sand 3,080-88 ft., 3,102-08 ft., Levias 3,234-44 ft., T.D. 3,347 ft.

Ste. Marie, Jasper County: C. R. Craft 1 Reis, E½ SE NE 6-5n-14w, pumped 240 bbl., 5,000 gal. acid, McClosky 2,836-42 ft., T.D. 2,850 ft.

Salem, Marion County: Ohio 37 Young heirs, SE SE SW 20-2n-2e, flowed 64 bbl., 1,000 gal. acid at 4,620 ft., 2,000 gal. acid at 4,564 ft., Trenton 4,504 ft., old well deepened from 3,430-4,620 ft.

Ohio 17 Young, SE SE NW 20-2n-2e, flowed 204 bbl. in 12 hr., 2,000 gal. acid at 4,564 ft., 1,000 gal. acid 4,626 ft., Trenton 4,512 ft., old well deepened from 3,430-4,626 ft.

I. D. Lain 11 Dempsey, NE NE SW 31-2n-2e, pumped 47 bbl., natural, Trenton 4,486 ft., old well deepened from 3,385-4,619 ft.

Simms, Wayne County: Texas 1 Gregg, E½ SW NE 28-1s-6e, pumped 306 bbl., perf. 3,164-72 ft., 2,000 gal. acid, 30-qt. shot 3,038-55 ft., Aux Vases sand 3,033-62 ft., McClosky 3,166-70 ft., T.D. 3,185 ft.

Kingwood 1 O'Neil, S½ SE SE 17-1s-6e, pumped 26 bbl. oil and 16 bbl. water, 30-qt. shot 3,035-50 ft., Aux Vases sand 3,030-60 ft., T.D. 3,241 ft., P.B. 3,050 ft.

West Clay City, Clay County: Illinois Prod. Corp. 1 Kneff, N½ NE NE 15-2n-7e, dry at 3,132 ft., Glen Dean 2,506 ft., Golconda 2,605 ft., Paint Creek 2,785 ft., Benoist 2,860 ft., Renault 2,898 ft., Aux Vases 2,935 ft., Ste. Genevie 3,025 ft., Fredonia 3,073 ft.

OHIO, INDIANA, KENTUCKY

Deep Cambridge Anticline Test Misses Oriskany Sand

NEWARK, Ohio.—The Oriskany sand is apparently missing in the deep test of the Cambridge anticline in northern Washington County. The Columbia Carbon Co. 1 Charles Augenstein, Lot 49, Adams Township, is drilling at 4,420 ft., 162 ft. in the lime with no sand showing; the Oriskany horizon was expected at about 140 ft. in; top of the lime was had at 4,258 ft. Completions were light in all fields, however, activity is expected to increase in view of the modifications of the government conservation order in regard to acreage requirements for operations in the eastern fields.

OHIO COMPLETIONS

Ashland County, Mohican Township: Hoag et al 2 John Aber, Sec. 26, 20,000 cu. ft. gas, plugged, Berea, T.D. 710 ft.

Holmes County, Richland Township: Ohio Fuel 1 Rudy Mackey, Sec. 5, 1,100,000 cu. ft. gas, Clinton, T.D. 3,481 ft.

Click & Williams 1 Calvin Scott, Sec. 6, 700,000 cu. ft. gas, shot, Clinton, T.D. 3,052 ft.

Knox County, Brown Township: Upham Gas Co. 1 E. M. Wander, Sec. 22, dry, Clinton, T.D. 2,875 ft.

Medina County, Hinckley Township: H. C. Bishop 1 May Lisy, Lot 35, 14 bbl., 20,000 cu. ft. gas, shot, Clinton 3,141-3,201 ft.

Tuscarawas County, Sandy Township: Status Development Co. 1 John Schafer, Sec. 14, 130,000 cu. ft. gas, shot, Clinton, T.D. 4,940 ft.

Washington County, Barlow Township: Baker et al 1 H. B. Woodburn, Sec. 10, 35,000 cu. ft. gas, Salt sand, T.D. 1,510 ft.

Decatur Township: Tri-State O. & G. Co. 1 W. E. Stone, Fraction 25, dry, Berea, T.D. 1,865 ft.

Wayne County, Plain Township: Ohio Fuel 1 M. C. Ebright, Sec. 33, 140,000 cu. ft. gas, shot, Clinton, T.D. 3,101 ft.

Tanks Being Erected for Evansville Test

EVANSVILLE, Ind.—Storage tanks are being erected at a pool opener 2 miles south of Evansville, Sells Petroleum, Inc. 1 McCarty, NE SW NW 32-6s-11w. Saturation was encountered in the Waltersburg sand at 1,699-1,717 ft. and oil rose 175 ft. in the hole during the first 55 minutes after plug was drilled. Because there were no storage tanks on location, oil was swabbed into the pits. No. 1 McCarty is expected to make a fair commercial producer. No gage is yet available.

Carter Oil Co. has staked a tentative location for a wildcat test in SW NW 9-7s-14w. The test is the 1 Baker and is about 2½ miles west and some south of the Mount Vernon field, the nearest production. The location, however, may be changed to another nearby 40-acre tract before drilling begins.

Sinclair-Wyoming 1 D. G. Nash, SW SW NE 32-7s-14w, a wildcat in the southern part of Posey County, was drilling near 2,600 ft. last week end. In a core of Cypress sand a spotty show of dead, noncommercial oil was found.

WESTERN KENTUCKY COMPLETIONS

Daviess County, Utica district: Globe 12 J. M. Clark, dry, T.D. 1,174 ft.

F. Randall et al 4 Roy Hansford, dry, T.D. 1,718 ft.

Hancock County, Pellville district: McDonough & Co. 1 Jennie Voyles, dry, T.D. 478 ft.

Union County, Morganfield district: Sun and Kentucky Natural Gas 3 Sloan McKinney, 40 bbl., Pennsylvanian sand, T.D. 1,373½ ft.

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Among the Drilling

Contractor and Company Costs Of Drilling Not Comparable

DURING the past several years there has been a tendency to compare drilling costs of contractors with that of the drilling departments of oil companies. This has arisen partially from the practice of some companies of maintaining several rigs in each area partially as a check on the results from drilling dollars spent. The rigs are also used experimentally to some extent.

There have been efforts to correlate the costs as claimed by the drilling contractors with those claimed by the oil companies. Some divergence would naturally be expected, but nothing like the span existing between the two sets of figures. The result has been a questioning of both sets of figures.

Several drilling contractors and the heads of the drilling departments have independently come to the conclusion that the reason the drilling costs for the two types of operation do not agree is because they are not comparable. There are too many differences in the operation of company and contractor tools for drilling-cost figures to become a yardstick of comparison.

Numerous items of expense borne by the drilling contractor are not chalked up against the company rig. For instance, much of the trucking expense involved in drilling is charged to lease operation, or to truck maintenance of the oil company. In some cases rig repairs are not charged to the rig. This is primarily due to the difficulty of charging the costs to the proper account in a large company operation. Supervision of the drilling operation is likewise generally distributed over the entire company operation rather than being charged entirely to the rig. Another important item in company-tool operation is the technical skill, both engineering and geological, available to the rig supervisor.

The two biggest expenses borne by the contractor which do not enter into oil-company-tool operation are the cost of obtaining contracts and the down time. The latter is a very important item as depreciation, taxes, office expense, insurance and general overhead go on whether the rig is operating or not. Waits of several days, several weeks, or even months, are not uncommon for contractor's tools. There is also the additional expense of stacking the rig instead of moving it directly from location to location. Contrasted with the company rig which goes directly from one location to another, this item is very important.

Traveling, legal advice, advertising, office time in figuring bids and the organization of the crews all add up to a sizable total for the cost of obtaining contracts.

Insurance is another item which does not fall alike on both company and contractor-operated rigs. The latter, because of the periodic shutdowns, suffer a higher turnover in labor with a consequent higher insurance cost. In addition, the contractor is seldom able to carry all or part of his own insurance.

Closer personal supervision, the desire and necessity for showing a profit on the part of the drilling crews, and their willingness to speed the job as much as possible all reduce the cost of actual drilling on a contract job to a certain extent. However, this is not enough to offset the other factors and allow the drilling contractor to take the job at the figure quoted for company-rig costs.

Despite the added cost of operation of contract rigs, they are still the most economical for the bulk of the drilling work. Most companies could not afford to have the variety or number of rigs necessary to carry on their work during periods of rapid development, as most of them would be idle when the slump in activity occurred. Under the present system, some companies have a large number of operations at one time while others are comparatively idle. This situation switches frequently. All companies can thus use contract rigs without adding to their capital burden.

Nearest approach possible for cost of operation of a contract rig in comparison to company rig is where a group of contracts is secured. This allows the contractor to eliminate several items of cost (down time, contract costs, and some insurance and overhead) and the costs for the two types of operation come closer together. However, generally direct comparison of the costs of company and contract tools is futile and meaningless.

•

RALPH E. FAIR, San Antonio, Tex., received contract from H. C. Cockburn et al for 1 Gayle, a projected 7,700-ft. Wilcox test located in the Plantersville area, Grimes County, Texas. The well is located in the C. B. Stewart Survey.

ALLEN & MORRIS, San Antonio, Tex., have apparently uncovered a new gas field in Bee County, Texas, with the showing of Shield 1 Ira Heard, a wildcat located about 2 miles southeast of the Heard field. Drill-stem testing at 3,927-37 ft., tested 600 lb. working pressure and the well is drilling ahead in shale below 4,375

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Contractors

ft. Drilling is expected to be started in the new South Caesar field, Bee County, Texas, following the completion of Tom Slick, Jr., 1 Grissom which opened the first crude production from the Carrizo sand in Southwest Texas. Other operations are scattered over the district, with drilling operations reported in Jim Wells, Nueces, San Patricio and Refugio counties.

LOFFLAND BROTHERS, Houston, Tex., received contract from Amerada Petroleum Corp., for 1 Williams, a projected deep wildcat located in Iberia Parish, coastal Louisiana.

MORRIS-HAMILTON Drilling Co., Houston, Tex., is moving a rotary to Hidalgo County, Texas, where drilling is to be started on a large block for Dr. Burton McCollum.

RUTHERFORD Drilling Co., Houston, Tex., has moved a rotary to the active Midway field, Lafayette County, Arkansas, where locations for several wells were made following the discovery of this new field.

GLENN McCARTHY, Houston, Tex., is preparing to drill deeper in his 1 Munson, a wildcat located in the Bailey's Prairie area, Brazoria County, Texas, after cementing a protection string of 7-in. casing at 10,900 ft. This contractor has other rigs running in the Magnolia field, Montgomery County, Texas, and the Stowell field, Jefferson County, Texas.

DIRKS BROTHERS, Beeville, Tex., are preparing to move a rotary 2 miles west of the Dirks field, Bee County, Texas, for 1-B Dugat, a 4,000-ft. Pettus sand test located in the J. Poitevent Survey.

HARRY L. EDWARDS Drilling Co., Houston, Tex., has taken over the wildcat recently started in the Winnie area, Jefferson County, Texas, by Earl Hankamer. Other rotaries are located in the St. Charles field, Aransas County, Texas, for Continental Oil Co. in the Thornwell area, Jefferson Parish, Louisiana, for Cities Service Oil Co., and in the Cologne field, Victoria County, Texas, for Jimmie Gray.

MARKLEY - BANKHEAD, Inc., Houston, Tex., is moving a rotary to the Happytown field, St. Martin Parish, Louisiana, where an 11,000-ft. well will be drilled on the Iberville Land Co. holdings. The well is being drilled on a farmout from the Shell Oil Co., Inc., located in 111-7s-8e.

BASS & DILLARD, drilling contractors, Wichita Falls, Tex., were moving in rotary material at the latter part of the week for Gulf 1-C W. L. Foster, scheduled 8,000-ft. wildcat test in Sterling County, Texas, 3 miles southeast of Sterling City, Tex. Cellar, pits and water well have been completed. The location is 660 ft. from the north and west lines of Section 28, Block 12, in the S.P. R.R. Survey.

H. R. BURDEN has the contract and an interest in the test with J. G. Mayo, Houston. Tex., for drilling a wildcat in the B. Newton Survey, 5 miles northeast of Rush, Cherokee County, Texas. Location is on the New Birmingham Development Co. land. Contract is for 4,500 ft. or the Woodbine sand.

SIEBOLDT Drilling Co. is trying to complete as a producer its 1 E. M. Wolfe, Section 623, T.E.&L. Survey, James field, Young County, Texas, in lime at 4,277-4,375 ft. This is an old well deepened.

LOHAN Drilling Co. has brought in a gas well in 1 G. O. Hazelton, drilled to its own account, in the J. Harmon Survey, 2 miles southeast of Graham, Young County, Texas. The well, a wildcat, drilled to 4,310 ft., is shut in.

ROWAN Drilling Co. is in line to open a new field on the Texas Gulf Coast with its 1 Land, Donley Survey, on the Double Bayou prospect, south of Anahuac, Chambers County. Attempts are being made to complete the well through casing perforations in a 9,500-ft. sand.

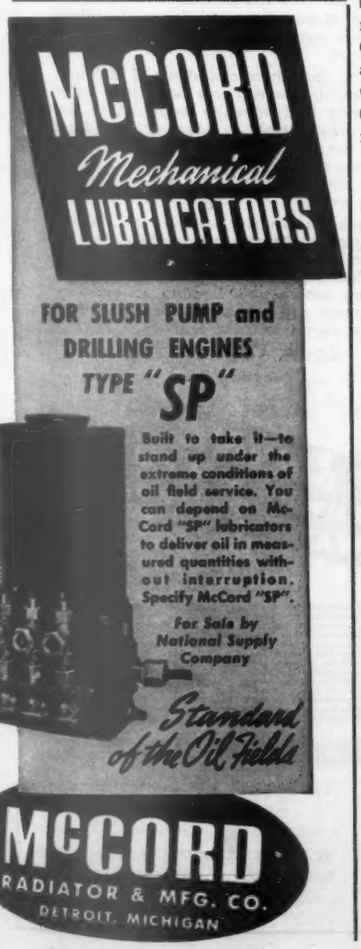
W. M. COATS, Longview, Tex., has contracted to drill a 6,250-ft. wildcat test for D. V. Davis, Atlanta, Tex., in the B.B.B.&C. Survey, 4 miles north of Naples, north Morris County. The test is on a 5,000-acre tract.

Decimally Marked Tapes Aid in Pipe Measurement

DISSATISFACTION with the English system of measurement (feet, inches, etc.) has long been expressed by technical men, but more recently it has been the subject of discussion among drilling crews. Some errors in pipe measurement have been occasioned by using fractions of inches instead of tenths.

The error arises due to the habit of "giving and taking" when measuring drill pipe and casing. This consists of reading to the nearest half inch on the ordinary tape line. If there are a number of joints of identical length involved, an error may pile up. There are also greater possibilities of misreading the tape. Where the inches are divided into tenths, the tape can be read easily to the nearest division.

Several contractors have recently replaced fractionally marked tapes with decimal-marked ones. A few have gone even farther and adopted surveyor's tapes in which the foot and inch scale is replaced by a decimal scale. Principal advantages are the ease of reading and the elimination of a separate addition involved in converting inches to feet.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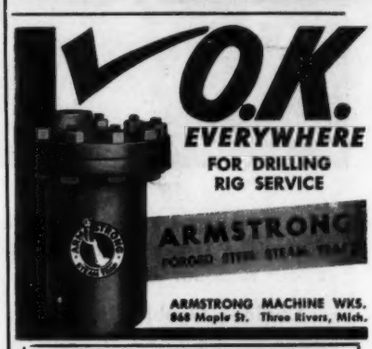

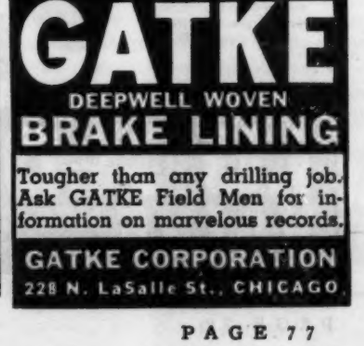
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Kansas Fields

(Continued from Page 70)

Westhusin, Rooks County: Leavell Coal 3 Baxa, S½ S½ NW 12-9-17w, old well, old T.D. 3,240 ft., Lansing 3,299 ft., T.D. 3,305 ft., potential 598 bbl.

Plainstock Oil 3 Westhusin, E½ SE SE 11-9-17w, potential 362 bbl., Lansing 3,154 ft., T.D. 3,336 ft.

Wherry, Rice County: Mid-Plains 4 Nelson, N½ SW NW 12-21-7w, dry, T.D. 3,455 ft.

Wilkins, Ellsworth County: Herndon Drilling 1-A Kruse, W½ SW NW 20-17-9w, potential 2,889 bbl., Arbuckle 3,236 ft., T.D. 3,239 ft.

Nebraska

ST. JOSEPH, Mo.—Skelly Oil Co. probably will have its tenth producer soon in the Barada pool of Richardson County, Nebraska. Pipe was set in 2 Steinbrink for a test of the Hunton. Over in the Dawson pool, also in Richardson County, a test of Viola lime was awaited at Power Oil Co. 1 Bohrer, but operators said they could not obtain cable tools to drill plug and test.

Activity in Jefferson County, Kansas, in the McLouth pool, is decreasing week by week because of the government well-spacing rule. E. H. Hatcher and his associates, who were drilling on farmouts from the Magnolia Petroleum Co., have made no new starts.

NEBRASKA COMPLETIONS

Richardson County wildcat: Davisson & Gooden Kauf 1 Schwang, C NW SW 34-3n-16e, dry, T.D. 2,606 ft., Lansing 920 ft., Mississippi 2,145 ft., base Mississippi 2,290 ft., Hunton 2,525 ft.

Barada, Richardson County: Skelly 1 Mary Mack, W½ SW SW 25-3n-16e, pumped 122 bbl. in 23 hr., natural, Hunton 2,480-2,530 ft.

MISSOURI COMPLETIONS

Wildcat, Caldwell County: H. Leuring 1 F. B. Albright, E½ SE 32-55n-28w, dry, Polo sand 390 ft., T.D. 817 ft.

Texas Gulf Coast Fields

(Continued from Page 69)

Hamill Drilling Co. 10-B Meyers, 157 bbl., 5/32-in. choke, perf. casing 2,380-2,410 ft., T.D. 2,521 ft.

Maurbro, Jackson County: Humble 3 Bonnot, 99 bbl., ¼-in. choke, sand 5,215-29 ft.

Humble 8-B Mauritz, 325 bbl., ¼-in. choke, sand 5,224-30 ft.

North La Ward, Jackson County: Humble 6 Four Way Ranch, 562 bbl., ¼-in. choke, sand 5,211-20 ft.

Magnolia 12 Gordon, 148 bbl., 7/64-in. choke, top sand 5,215 ft., T.D. 5,225 ft.

Magnolia 13 Gordon, 154 bbl., 7/64-in. choke, perf. casing 5,221-25 ft., T.D. 5,226 ft.

Moore & Ahern 5 Burdett, 436 bbl., ¼-in. choke, perf. casing 5,206-14 ft., T.D. 5,218 ft.

Old Ocean, Brazoria County: Harrison & Abercrombie 12 Bernard, 403 bbl., ¼-in. choke, top sand 10,035 ft., T.D. 10,994 ft.

Oyster Bayou, Chambers County: Sun 9 Jackson, 749 bbl., ¼-in. choke, perf. casing 8,260-8,300 ft., T.D. 8,375 ft.

Willow Slough, Chambers County: Sun 5-A Broussard-Hebert, 119 bbl., ⅛-in. choke, perf. casing 8,472-77 ft., T.D. 8,482 ft.

Withers, Wharton County: Texas 83-B Pierce, 82 bbl., ⅛-in. choke, perf. casing 5,539-42 ft., T.D. 5,546 ft.

F. W. Michaux 8-A Pierce, 172 bbl., 5/32-in. choke, perf. casing 5,315-30 ft., T.D. 5,390 ft.

F. W. Michaux 12-A Pierce, 133 bbl., 5/32-in. choke, top sand 5,373-90 ft., T.D. 5,390 ft.

F. W. Michaux 31-A Pierce, 16 bbl., 5/32-in. choke, perf. casing 5,366-73 ft., T.D. 5,385 ft.

F. W. Michaux 51-A Pierce, 143 bbl., 5/32-in. choke, perf. casing 5,315-20 ft., T.D. 5,335 ft.

Appalachian Fields

(Continued from Page 71)

Roane County, Walton district: Roane County Oil Co. 6 M. F. Cummins, 5 bbl. before shot and some gas, Big lime 1,847-1,996 ft., Big Injun 1,996-2,062 ft., gas 2,008-21 ft., oil 2,040-62 ft., T.D. 2,062 ft.

Wayne County, Stonewall district: Owens, Libby-Owens 9 Guyan Oil Co., 373,000 cu. ft. gas after shot, Big lime 1,370-1,543 ft., Berea 2,150-75 ft., brown shale 2,310-3,088 ft., shot 2,628-3,086 ft., T.D. 3,118 ft.

ORISKANY GAS FIELDS

Jackson County, Ripley district: West Virginia Gas Corp. 1 J. I. Miller, 4,204,000 cu. ft. gas, Salt sand 1,355-1,755 ft., Big lime 1,755-1,835 ft., Injun 1,845-90 ft., Berea 2,317-30 ft., Corniferous 4,800-4,904 ft., Oriskany 4,904 ft., gas 4,906-32 ft., T.D. 4,832 ft.

Mullins Gas Co. 1 C. C. Board, 38,000 cu. ft. gas after shot, Maxton sand 1,710-1,835 ft., Big lime 1,835-90 ft., Big Injun 1,973-77 ft., Berea 2,340-48 ft., Corniferous 4,872-4,978 ft., Oriskany 4,978 ft.; after shot R.P. 300 lb., T.D. 5,018 ft., abandoned.

Washington district: Belmont Quadrangle Drilling Co. 1 S. G. and C. W. Starcher, 747,000 cu. ft. gas, Big lime 1,769-1,830 ft., Injun 1,830-55 ft., Berea 2,275-85 ft., Corniferous lime 4,878-5,033 ft., Oriskany 5,003-65 ft., shot 5,081-86 ft., R.P. 1,845 lb., T.D. 5,086 ft.

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MICHIGAN OPERATIONS

Flush Fields to Be Curtailed If State Allowable Drops

By OTTO C. PRESSPRICH

SAGINAW, Mich. — With operations and production already cut below what they consider logical limits, Michigan oil men heard as the week ended that further substantial reductions in the state's quotas are being considered by the federal office of petroleum control.

P. J. Hoffmaster, state supervisor of wells, said Saturday he had learned that Harold L. Ickes, petroleum coordinator, may cut another 13,000 bbl. from Michigan's production quota, reducing the allowable withdrawal to 34,000 bbl. In that event, the big producing wells will have to carry the brunt of the reduction, the supervisor said, because to further reduce the take from smaller wells will necessitate their abandonment and loss of remaining oil.

While declaring Michigan oil men are entirely willing to do their part in the war program, Mr. Hoffmaster declared, "We do question advisability of reducing Michigan's production under market demand." He added that the opinion is that such a further production cut would have a tendency to curtail development and might force some of the smaller refineries to suspend operations because of the lack of crude. Mr. Hoffmaster already has made some unavailing protests to Secretary Ickes against the scope of federal orders.

Last week operators abandoned several locations in accordance with OPC orders and in consequence acted to restrict development. Of completions last week, best results were in the Headquarters field of Roscommon County, one well coming in for a potential of 3,240 bbl. a day. Osceola County—the Reed City field—activities included three completions in Section 29, all of which resulted in producers small in comparison with the majority of wells drilled in other parts of the field. Reed City development now appears to be confined to the possibility of extensions to the north and south.

Meanwhile the prospects for deep-strata production in the Kent-Ottawa field went glimmering as a Walker field test was abandoned as a dry hole in the St. Peter formation at below 5,200 ft.

MICHIGAN COMPLETIONS

(Two-week period)

Allegan County, Hopkins Township: Frank S. Vahue 1 Stone, SE NE NW 7-3n-12w, wildcat, dry, T.D. 1,645 ft.

Ira A. Moore 1 Puschel, NE NW SE 18-3n-12w, pumping 20 bbl., acidized, T.D. 1,567 ft.

Martin Township: Charles W. Cook 1 Johannes and Van Mol, SW SW SW 30-2n-11w, wildcat, dry, T.D. 1,618 ft.

Otsego Township: Fisher-McCall 1 Salisbury, NW NW SE 28-1n-12w, wildcat, dry, T.D. 1,585 ft.

Salem Township: W. Spencer Cook and Vic R. Wilson 1 Grooters, NE NE SW 28-4n-13w, wildcat, dry, T.D. 1,654 ft.

Arenac County, Adams Township: Ervin Major 2 Bryan, SE NE SW 22-19n-3e, dry, T.D. 3,011 ft.

Rayburn and Major 3 Collins, NE NW NE 22-19n-3e, dry, T.D. 3,041 ft.

W. V. Ingram and P. J. Rogers 1 Ames, NW NW NW 23-19n-3e, pumping, 40 bbl., acidized, T.D. 2,986 ft.

Deep River Township: W. E. Ross 2 Mutch, NW NW SE 17-19n-4e, 6,260,000 cu. ft. gas, T.D. 1,511 ft.

Lincoln Township: Socony-Vacuum 1 Thomas, E½ NE SE 8-18n-4e, wildcat, dry, T.D. 2,928 ft.

(Continued on Page 82)

CANADIAN FIELDS

Find Large Producers in North Turner Valley Area

By VICTOR LAURISTON

CHATHAM, Ont.—Crude and natural-gasoline production from Alberta fields for the week ending February 2 averaged 28,102 bbl. daily, compared with 27,554 bbl. daily for the previous week and 25,661 bbl. daily for the corresponding week last year. The daily average included 26,680 bbl. of crude and 1,103 bbl. of natural gasoline from Turner Valley and 319 bbl. of crude from outside fields. There were 198 crude-producing wells, 35 drilling, 3 finished, 1 new producer, 9 testing, 1 shut down, 1 abandoned, 3 spudded, and 1 drilling permit issued.

In North Turner Valley, Atlas-British Dominion 2, LSD 4, 17-21-3w5, most northerly producer in the field, finished at 8,710 ft. with Madison at 8,285 ft. After initial mud wash of 750 gal. it produced at the rate of 36.4 bbl. an hour on a 10½-hour test. Further acidization increased this to 59.7 bbl. on a 20-hour test and acidizing and testing is being continued, with another big producer indicated.

Major Oil Investments 4, LSD 8, 8-21-3w5, finished at 7,836 ft. with Madison at 7,415 ft., after acidizing produced 1,921 bbl. flush on a 24-hour test, with pressure on casing 1,100 lb. and on tubing 470 lb., and 888.7 cu. ft. gas-oil ratio. A subsequent test showed 1,810 bbl. daily. The well looks like the largest in the field.

TURNER VALLEY LIME TESTS

North Turner Valley: Foothills Oil & Gas 11, LSD 11, 4-21-3w5, below 6,981 ft., Madison lime at 6,878 ft.

Miracle Royalties 2, LSD 6, 4-21-3w5, below 7,448 ft., Madison at 7,250 ft.

Foothills Oil & Gas 10, LSD 2, 4-21-3w5, T.D. 8,069 ft., Madison at 6,896 ft., flowing 800 to 900 bbl. daily after acidizing, completing tests for allowable.

Royalite Oil 60, LSD 5, 14-20-3w5, T.D. 8,216 ft., Madison at 7,703 ft., initial production 261 bbl. daily.

West Central section: Anglo-Canadian Oils 11, LSD 5, 25-19-3w5, finished at 8,119 ft., Madison at 7,885 ft., acidizing and testing; will take production only from upper porous zone.

Drillers & Producers 3, LSD 3, 7-19-2w5, T.D. 8,152 ft., Madison at 7,701 ft., made 11 bbl. hourly with 1,810 lb. bottom-hole pressure, acidizing and testing.

Alberta Pacific Royalties 1, LSD 14, 6-19-2w5, T.D. 8,325 ft., Madison at 7,872 ft., made 14 bbl. hourly after acidizing, continuing tests.

Northerly Test Started

A new potential extension of North Turner Valley will be tested by Admiral Oils 1, which has derrick up in LSD 12, 27-22-4w5. Location is approximately 8¾ miles north and 4 miles west of Atlas-British Dominion 2, most northerly producer in the field, and is directly on strike with the Major Oils 10 and Ace Royalties 2 tests farther south, which are logging satisfactorily. Madison limestone is estimated at 7,300 ft. with production around 7,800 ft., somewhat shallower than in the recent large completions farther south.

OUTSIDE TESTS

Grease Creek: Grease Creek-Northwest 2, LSD 7, 13-29-7w5, in Blairmore formation below 6,360 ft.

Clearwater: Ram River Oils 2, 1-37-11w5, in Devonian limestone below 3,484 ft., oil shows and fair gas flow.

Livingstone Range: Royal Sun Petroleums 1, LSD 2, 17-13-3w5, in Madison limestone nearing Devonian.

Monitor: McColl-Frontenac 1, LSD 4, 5-32-4w4, in Devonian limestone below 3,710 ft.

Tilley: Northwest Co. 1, LSD 1, 7-17-12w4, T.D. 3,208 ft., Madison 3,169 ft., acidizing and testing.

Northwest 2, LSD 4, 17-17-12w4, rigged.

(Continued on Page 82)

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Regulators meet all needs of Pressure-Control in Peace or War

Every need of pressure-control in the handling of gas, oil, air, steam, water — for whatever use, by the utility company, the industrial plant, or the domestic consumer — has been provided for in the complete line of C-F Regulators. Weight-and-lever types, spring-loaded types, and pilot-operated types are specifically adapted for the accurate and reliable control of either high or low pressures, under varying conditions. Write for complete catalog.

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ARKANSAS COMPLETIONS

Wildcats

Little River County: A. Gutowsky 1 Mills, SW cor. 18-12s-29w, dry, T.D. 3,660 ft.. Tokio 665 ft., Paluxy 1,014 ft., anhydrite 1,948 ft., base anhydrite 2,042 ft., Travis Peak 2,422 ft., Eagle Mills 2,934 ft., Paleozoic 2,992 ft.

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Troy V. Post 1-A Bostwick, SE SW 13-22n-16w, dry, T.D. 2,627 ft.

Haynesville, Claiborne Parish: Black Well Oil 1 Milner, SW SE 22-23n-8w, 1,200 bbl., 5,330-5,415 ft., T.D. 5,455 ft.

Blackwell Oil 2 Milner, NW SE 22-23n-8w, abandoned location.

Nebo, La Salle Parish: H. L. Hunt 42-A Goodpine, SW NE 21-7n-3e, 128 bbl., 4,024-34 ft., T.D. 4,118 ft.

Patrick & Lyrell 1 Goodpine, NE NE 21-7n-3e, 176 bbl., 4,000-7 ft., T.D. 4,075 ft.

Trout Creek, La Salle Parish: Hunter Corp. 1 Gross, SE SE 18-8n-3e, dry, T.D. 3,700 ft.

Rocky Mountain Area

(Continued from Page 74)

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COLMONOY is the easiest of all hard-surfacing alloys to apply. There is a grade for every hard surfacing requirement. Use COLMONOY to recondition worn pump sleeves, pump rings, plungers, wash pipes and all parts subject to excessive corrosion and abrasion.

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THE OIL AND GAS JOURNAL
TULSA, OKLAHOMA

MISSISSIPPI and SOUTHEAST

Pickens-Sharpsburg Field Defined to Southeast

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The failure was Carter 1 C. B. Cooper, SE NE 14-11n-3e, 3 miles southeast of the field. It topped the Wilburn sand at 4,966-5,027 ft. The sand was void of oil shows and in drilling deeper the Tuscaloosa was topped at 5,545 ft. It was quit at a total depth of 5,851 ft.

Phillips 1 Gene, diagonal offset to the Pickens-Sharpsburg discovery well and located in SW SE 4-11n-3e, is having pump installed for completion attempts. Its last gage showed an estimated 30 per cent oil and 70 per cent salt water. This was based on a daily producing capacity of 149 bbl. of oil and 600 bbl. of water. The production is from 4,849-52 ft. through perforations in the 7-in. casing set at 4,895 ft.

Adams County Wildcat Gets Deep Show

In Adams County where several months ago the off-shoot of the Central Louisiana Wilcox play became the most intense, a wildcat is preparing to test shows found in the deep Wilcox zone at 5,600 ft. It is Roy L. Fisher 1 S. H. Lambdin, NW NW 36-8n-2w. The well topped the Vicksburg at 1,402 ft., Jackson 1,495 ft., Moody's Branch marl 1,918 ft., Cockfield 1,943 ft., Cook Mountain 2,429 ft., Camerina 2,585 ft., Sparta 2,688 ft., Tallahatchie 3,807 ft., Wilcox at 3,952 ft. and is bottomed at a total depth of 7,104 ft. Through the Wilcox section a total of 92 side-wall cores were taken, several revealing slight shows of oil or gas, however, only two cores actually showed any degree of saturation. These were at 5,652 ft. and at 5,691-93 ft. The well is at present shut down, but testing will start in the near future.

MISSISSIPPI COMPLETIONS

Wildcats

Madison County: Carter 1 C. B. Cooper, SE NE 14-11n-3e, top Tallahatchie 888 ft., Wilcox 1,197 ft., Midway 3,150 ft., Selma chalk 3,952 ft., base Selma 4,355 ft., Eutaw 4,926 ft., Wilburn sand 4,966-5,027 ft., Tuscaloosa 5,545 ft., dry at 5,851 ft.

Fields

Tinsley, Yazoo County: Frank & Geo. Frankel 5 Minnie Barnes, NW NW SE 1-9n-3e, Woodruff 4,907-22 ft., T.D. 4,922 ft., pumped 12 bbl. an hr.

W. B. Johnson & Texas Co. 5 B. Hennis, NW NE SW 36-10n-3w, Woodruff 4,672-4,712 ft., T.D. 4,758 ft., pumped 17 bbl. an hr.

E. C. Johnston 10 Martin, NW SE NE 2-9n-3w, abandoned location.

Slick-Urschel Oil 17 Slick estate, NE SE 35-11n-3w, McGraw sand saturation 5,782-5,808 ft., perf. casing 5,780-5,810 ft., pumped 300 bbl., T.D. 6,081 ft.

Slick-Urschel Oil 23 Slick estate, NW NE 35-11n-3e, top Perry sand 5,285 ft., Stevens sand 5,370 ft., McGraw sand 5,790 ft., dry at 5,812 ft.

Gas Distillate Production at Thornwell, Louisiana

Gas-distillate production was officially established on the Thornwell prospect, Jefferson Davis Parish, with the completion of Cities Service 1 Lacassine Land Co., which gaged 1,250,000 cu. ft. of gas and an unestimated amount of 51-gravity water-white distillate daily while testing through a 9/64-in. choke. The well has been in the process of completion for the past few weeks, and final completion was made in sand at 9,632-38 ft. Several tests at 9,800 ft., and 10,320 ft., showed gas, distillate and salt water. The discovery is located in 36-11s-5w.

Two Lower Gulf Coast Fields Extended

Important extensions were opened in two lower Gulf Coast fields. In the Odem field, San Patricio County, Seaboard 4-B Welder flowed at the rate of 163 bbl. daily through a ⅛-in. choke from perforated casing opposite sand at 5,427-37 ft. The completion extends production about 1 mile southwest and opens the possibilities of production being merged with that of the Angelita field. About 1 mile southwest of the Seeligson field, Shell 1 L. Seeligson is flowing at the rate of 180 bbl. daily through a 7/64-in. choke from 15 ft. of sand topped at 5,983 ft. Tubing pressure was 1,195 lb., and casing pressure 1,295 lb.

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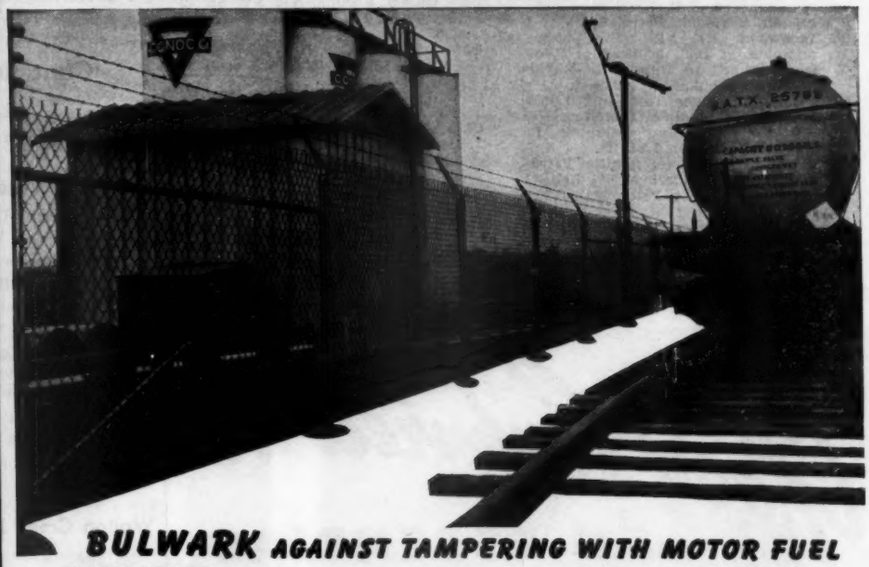

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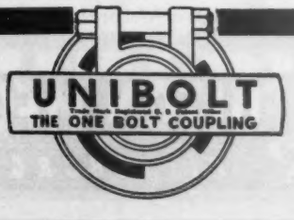

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Phillips 1 Gene, diagonal offset to the Pickens-Sharpsburg discovery well and located in SW SE 4-11n-3e, is having pump installed for completion attempts. Its last gage showed an estimated 30 per cent oil and 70 per cent salt water. This was based on a daily producing capacity of 149 bbl. of oil and 600 bbl. of water. The production is from 4,849-52 ft. through perforations in the 7-in. casing set at 4,895 ft.

Adams County Wildcat Gets Deep Show

In Adams County where several months ago the off-shoot of the Central Louisiana Wilcox play became the most intense, a wildcat is preparing to test shows found in the deep Wilcox zone at 5,600 ft. It is Roy L. Fisher 1 S. H. Lambdin, NW NW 36-8n-2w. The well topped the Vicksburg at 1,402 ft., Jackson 1,495 ft., Moody's Branch marl 1,918 ft., Cockfield 1,943 ft., Cook Mountain 2,429 ft., Camerina 2,585 ft., Sparta 2,688 ft., Tallahatchie 3,807 ft., Wilcox at 3,952 ft. and is bottomed at a total depth of 7,104 ft. Through the Wilcox section a total of 92 side-wall cores were taken, several revealing slight shows of oil or gas, however, only two cores actually showed any degree of saturation. These were at 5,652 ft. and at 5,691-93 ft. The well is at present shut down, but testing will start in the near future.

MISSISSIPPI COMPLETIONS

Wildcats

Madison County: Carter 1 C. B. Cooper, SE NE 14-11n-3e, top Tallahatchie 888 ft., Wilcox 1,197 ft., Midway 3,150 ft., Selma chalk 3,952 ft., base Selma 4,355 ft., Eutaw 4,926 ft., Wilburn sand 4,966-5,027 ft., Tuscaloosa 5,545 ft., dry at 5,851 ft.

Fields

Tinsley, Yazoo County: Frank & Geo. Frankel 5 Minnie Barnes, NW NW SE 1-9n-3e, Woodruff 4,907-22 ft., T.D. 4,922 ft., pumped 12 bbl. an hr.

W. B. Johnson & Texas Co. 5 B. Hennis, NW NE SW 36-10n-3w, Woodruff 4,672-4,712 ft., T.D. 4,758 ft., pumped 17 bbl. an hr.

E. C. Johnston 10 Martin, NW SE NE 2-9n-3w, abandoned location.

Slick-Urschel Oil 17 Slick estate, NE SE 35-11n-3w, McGraw sand saturation 5,782-5,808 ft., perf. casing 5,780-5,810 ft., pumped 300 bbl., T.D. 6,081 ft.

Slick-Urschel Oil 23 Slick estate, NW NE 35-11n-3e, top Perry sand 5,285 ft., Stevens sand 5,370 ft., McGraw sand 5,790 ft., dry at 5,812 ft.

Gas Distillate Production at Thornwell, Louisiana

Gas-distillate production was officially established on the Thornwell prospect, Jefferson Davis Parish, with the completion of Cities Service 1 Lacassine Land Co., which gaged 1,250,000 cu. ft. of gas and an unestimated amount of 51-gravity water-white distillate daily while testing through a 9/64-in. choke. The well has been in the process of completion for the past few weeks, and final completion was made in sand at 9,632-38 ft. Several tests at 9,800 ft., and 10,320 ft., showed gas, distillate and salt water. The discovery is located in 36-11s-5w.

Two Lower Gulf Coast Fields Extended

Important extensions were opened in two lower Gulf Coast fields. In the Odem field, San Patricio County, Seaboard 4-B Welder flowed at the rate of 163 bbl. daily through a ⅛-in. choke from perforated casing opposite sand at 5,427-37 ft. The completion extends production about 1 mile southwest and opens the possibilities of production being merged with that of the Angelita field. About 1 mile southwest of the Seeligson field, Shell 1 L. Seeligson is flowing at the rate of 180 bbl. daily through a 7/64-in. choke from 15 ft. of sand topped at 5,983 ft. Tubing pressure was 1,195 lb., and casing pressure 1,295 lb.

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Michigan Fields

(Continued from Page 79)

Clare County, Hamilton Township: Sun 1 McClure-Wilson, C SW 9-19n-3w, wildcat, temporarily abandoned.

Winterfield Township: Rowmor Corp. and D. E. Hughes 4 Wyman, E½ SW SE 29-20n-6w, 467 bbl., T.D. 3,731 ft.

McClanahan Oil Co. 1 Barhite, E½ NW SE 30-20n-6w, dry, T.D. 3,818 ft.

Pure Oil Co. 2 Riker, E½ SW NE Sec. 29, 600 bbl., acidized, T.D. 3,765 ft.

Genesee County, Forest Township: Hugh H. Heinig 1 Davidson, NW NW NW 8-9n-8e, wildcat, dry, T.D. 1,927 ft.

Isabella County, Chippewa Township: Daily Crude Oil Co. 1 Davis et al, NW SW NW 3-14n-3w, 1,600 bbl., est., acidized, T.D. 3,638 ft.

Michigan Devonian Petroleum Co. 1 Workman, NE NE NE 4-14n-3w, pumping 11 bbl., acidized at 3,059 ft., deepened to Dundee and acidized for 35 bbl., T.D. 3,618 ft.

Kent County, Walker Township: Lucas & Wade Drilling Co. 1 McKay, NE SW SW 19-7n-12w, pumping 10 bbl., acidized, T.D. 1,941 ft.

Producers Committee (Smith Petroleum Co.) 1 Riddering, E½ SE SE Sec. 30, dry in St. Peter, T.D. 5,222 ft.

Lake County, Pinora Township: Ohio Oil Co. 1 Campbell, N½ NE SE 24-18n-11w, 275 bbl., T.D. 2,982 ft.

Louis Rose 1 Pfuhl, N½ NE SE Sec. 25, pumping 5 bbl., acidized, T.D. 3,645 ft.

Midland County, Jerome Township: Sun Oil Co. 1 McNett et al, N½ NE SE 15-15n-1w, wildcat, dry, T.D. 1,350 ft.

Missaukee County, Riverside Township: Turner Petroleum Co. 1 Kaminga, N½ NE NW 26-21n-7w, wildcat, dry, T.D. 3,931 ft.

Muskegon County, Egelston Township: Jacob Bolema 1 Whitlock, E½ NE SW 34-10n-15w, wildcat, dry, T.D. 2,287 ft.

Osceola County, Lincoln Township: Ohio Oil Co. 3 Heilman, S½ NW SE 19-18n-10w, 12,000 bbl. est., T.D. 3,599 ft.

Ohio Oil Co. 1-A Campbell, S½ SW NW 19-18n-10w, 875 bbl. first 19 hr., T.D. 2,962 ft.

Pure Oil Co. 4 Dunn, N½ NW SE 20-18n-10w, 2,160 bbl., acidized, T.D. 3,556 ft.

Ohio Oil Co. 1 Cooper-Ryan, N½ NE SW 29-18n-10w, 30 bbl., acidized, T.D. 3,598 ft.

Ohio Oil Co. 1 Blanding, N½ NW SE 29-18n-10w, 300 bbl., T.D. 3,536 ft.

Ohio Oil Co. 4 Auten communitized, S½ SE NW 29-18n-10w, 40 bbl., acidized, T.D. 3,577 ft., P.B. to 3,565 ft.

Ottawa County, Olive Township: W. Spencer Cook 1 Vinkemulder, NW NE SW 22-6n-15w, location abandoned.

Roscommon County, Roscommon Township: Ohio Oil Co. 3-A State, N½ NW SE 33-12n-3w, 3,240 bbl. est., T.D. 3,348 ft.

Ohio Oil Co. and Eugene Hilliard 2 State, N½ NW SE 34-21n-3w, location temporarily abandoned.

Mogul Oil Co. 2-A State, N½ NE SE 34-21n-3w, location temporarily abandoned.

Ohio Oil Co. and Eugene Hilliard 2-A State, N½ SE NE 33-21n-3w, 7,632 bbl., T.D. 3,350 ft.

Pure Oil Co. 3-B State Roscommon, N½ SW NW 34-21n-3w, 3,528 bbl., T.D. 3,348 ft.

Van Buren County, Bloomingdale Township: J. F. Burton 1 Stadler, SW SW SE 1-1s-14w, dry, T.D. 1,282 ft.

W. R. Borough, Inc., and K. A. Fox 3 Bell, SE NW SW 1-1s-14w, pumping 70 bbl., acidized, T.D. 1,296 ft.

Bangor Township: Circle Drilling Co. 1 Bonamigo, SW NE SE 34-2s-16w, wildcat, dry, T.D. 1,100 ft.

Canadian Fields

(Continued from Page 79)

Oyen: Standard 1 Province, LSD 16, 34-26-5w4, below 1,201 ft., casing set at 545 ft.

Aldersyde Location

In the High River-Aldersyde area, east of Turner Valley, New Ranchmen's Oil & Gas 1 has been spotted in LSD 16, 34-19-29w4. Location is about 3 miles south and west of the old Ranchmen's Oil Co. well in LSD 16, 13-20-29w4, standing at about 7,250 ft., after encountering numerous oil shows in horizons above the Madison, which was not reached. The new test is sponsored by Maynard Davies et al, and rotary tools will be used.

Walton Creek Prospect

Arrangements are being made for a test by Calgary and Toronto interests on a 12,000-acre block on Walton Creek, in the Fallen Timber area. Acreage is chiefly in Township 33-8w5, north and west of the Monarch and Cartier wells. The immediate area is previously untested, and has been geologized by Dr. B. R. McKay of the Geological Survey of Canada.

Vermilion Field

Richardson 1, LSD 14, 20-50-5w4, completed in 1941, has been placed on production from the sand around 1,842 ft. After reaming, cleaning, and bailing dry, oil rose 900 ft. in the hole. Pumping started at 175 bbl. daily, settling to 75 bbl. Princeville Petroleum 2, LSD 1, 31-50-5w4, is waiting for new rig to test production at 1,792 ft., some flowing production is being taken.

To Revise Quota System

Announcement has been made by J. J. Frawley, acting chairman of the Alberta Conservation Board, that, commencing March 1, the quota plan recommended by Dr. George Grainger Brown will be adopted in modified form for the Turner Valley field. Under Dr. Brown's scheme, wells will be given gas quotas, and permitted to produce as much crude as they can so long as the gas quota is not exceeded.

Alberta Oil Royalty Basis

Application has been made by the Alberta government to the Alberta Appeal Court to rule on the validity of three alternative proposals for modifying the previous flat royalty of 10 per cent on oil wells drilled on provincial lands. The plans are (1) a sliding scale of 5 to 15 per cent, with the assessed person given the option of a flat payment of 12½ per cent; (2) the same sliding scale with no alternative; (3) payment of a flat 12½ per cent with no alternative. The court will also rule on the validity of an order-in-council passed last May, but never enforced, increasing from 10 to 12½ per cent the royalty on crown lands leased before September 30, 1930, and providing a sliding scale with alternative flat rate for lands leased subsequent to that date.

Bituminous Sand Operations

Abasand Oils, Ltd., headed by Max W. Ball of Edmonton, is rebuilding that portion of the company's plant in the Athabaska bituminous-sand area destroyed by fire last November. Equipment capable of handling 600 tons of sand daily is being installed. The plant, which started operations last May, produced 16,928 bbl. of crude from approximately 18,852 tons of sand prior to the fire.

Saskatchewan Drilling

In the Kamsack area, eastern Saskatchewan, Kamsack Gas & Oil Co. drilled five wells in 1941 on acreage taken over from Coal Gate Oil Co., and will continue its development program this year. Some 33 wells.

(Continued on Page 91)

LEGAL

BANKRUPTCY SALE

At the office of the Referee in Bankruptcy, Room 372 Federal Building, Dallas, Texas, at 11 o'clock A. M. on Wednesday February 25, 1942, Lewis W MacNaughton, Trustee in Bankruptcy of The Illinois Oil Company, a Bankrupt, will offer for sale substantially all of the assets of The Illinois Oil Company in the possession of the Trustee, which include producing oil and gas leases in Winkler, Ward, Houston, Howard, Marion, and Gregg Counties, Texas, and Lea County, New Mexico; producing oil and gas payments in Winkler County, Texas, and Lea County, New Mexico; a producing royalty interest in Beauregard Parish, Louisiana; non-producing oil and gas leases and royalty in Arkansas, Illinois, Louisiana, and Texas; office furniture and fixtures, warehouse buildings, and equipment.

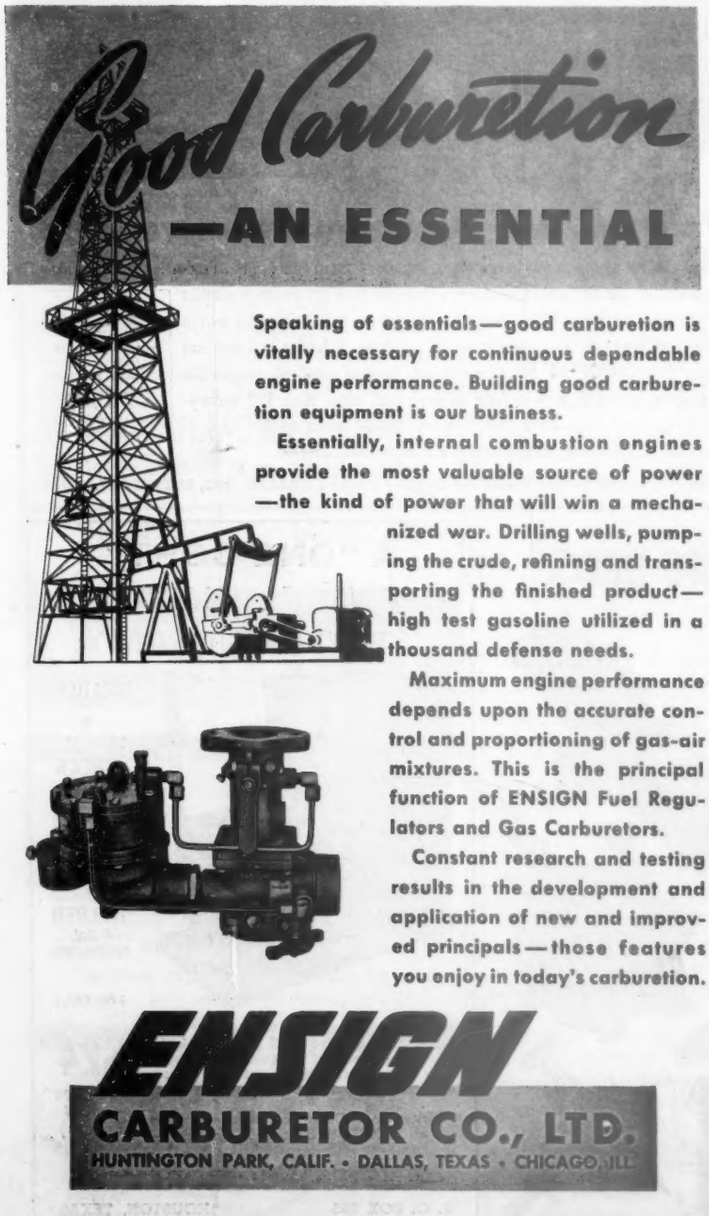
The sale will be at public auction and properties will be sold in parcels or in bulk. Detailed inventories and records are available for inspection in the office of E. M. Baker, Referee in Bankruptcy, Federal Building, Dallas, Texas, and in the office of The Illinois Oil Company, 1514 Santa Fe Building, Dallas, Texas.

LEWIS W. MacNAUGHTON
Trustee in Bankruptcy of
THE ILLINOIS OIL COMPANY
BANKRUPT
1000 Continental Building
Dallas, Texas
Telephone Riverside 1667.

LEGAL

OIL AND GAS LEASE

United States Department of Agriculture, Forest Service, Muskegon, Michigan, January 30, 1942. Sealed bids in triplicate will be received until 10:00 A.M. Eastern Standard Time, March 9, 1942, and then publicly opened, offering bonus for operating rights in connection with gas and oil leases on land located in the State of Michigan, Oceana County, Greenwood Township, T 13 N, R 15 West, Michigan Meridian, Section 30: S½ NW; NW SW. Award of lease will be made only to bidder who can show sufficient experience and financial resources and prove citizenship. Interested parties may obtain bid documents, lease forms and operating regulations from the Forest Supervisor, Forest Service, Muskegon, Michigan.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Conservation in Production Now Complicated by New Factors

(Continued from Page 26)

enough material available to meet demands if the 40-acre pattern is employed. It is known that 40 acres is not always suitable and, in view of the need for pressure maintenance, spacing may be regulated in order to have proper development. All factors must be reconciled to keep the wells flowing and to conserve pumps and equipment.

The greatest single waste lies in the production of an excess amount of gas in ratio to oil and the burning of oil-field flares. Gas occurs in solution and a cardinal principle of production is to keep the gas in that state to make the oil producible. Gas reduces tension and viscosity and is an important agent in moving oil to the well. The oil industry is now heading for a chemical status and this gas is important as a raw material. It is not known how much is wasted but it has been estimated that in Texas 1,500,000,000 cu. ft. is used daily as fuel, 910,000,000 cu. ft. in carbon-black plants and 750,000,000 cu. ft. is burned in gas flares.

Underground waste is a far more complex problem since the producer or petroleum engineer is a long way from the producing formation and has little control except in the rate of production. While many regard proration as a price-fixing device, it is now realized that open flowing can be done only at a cost. Oil pools must have taken a long time to form and it is obvious that any great flowing is a violent operation.

An exact comparison of two fields is impossible but the disparity between the Hobbs, New Mexico, and Tinsley, Mississippi, pools, each approximately 10,000 acres in area, illustrates the effect of improper development. Hobbs' original bottom-hole pressure was 1,550 lb. per sq. in. After 13 years, one-half of the reserve has been produced with a loss of only 400 lb. in the bottom-hole pressure and 85 per cent of the wells are still flowing. Tinsley's original bottom-hole pressure was 1,850 to 1,900 lb. per sq. in. In 2½ years it has produced one-third of its ultimate production and the bottom-hole pressure has fallen 1,000 lb. and no main-sand wells are flowing. There were 327 wells drilled at Tinsley, one-third more than at Hobbs, where a 40-acre pattern was followed while Tinsley's density averaged one well to 17 acres.

100-Octane Aviation Gasoline Present and Future

By WRIGHT W. GARY
Director of Refining, OPC

BASIC components of 100-octane gasoline are base stock, high-octane blending agent, light blending agent and tetraethyl lead fluid, some of which are obtained in modern refining, selectively extracted in natural-gasoline plants or synthesized from other petroleum products.

Base stock is a high-octane gasoline, supplies of which are limited but are being expanded by the use of catalytic cracking, isomerization, hydroreforming, etc., processes which require extensive, expensive and specialized facilities peculiar to each refinery. High-octane blending agent is

A.I.M.E. ABSTRACT

material synthesized from selected refinery gases, byproducts of refining and oil-field operations. Its supply is definitely limited by the rate and character of these operations. The light blending agent is low-boiling-point material needed for proper volatility and its limited supply can be augmented by catalytic cracking, isomerization, polymerization and alkylation.

Application of processes depends on availability of charging stocks, economics and existing equipment. The processes may be grouped in three broad classes: (1) Alkylation of butylenes with isobutane, fractionation for isopentane and for straightrun base stock; (2) catalytic cracking for butylenes, isopentane, isobutane and base stock and alkylation; (3) butane dehydrogenation to produce butylene, alkylation and fractionation of straightrun base stock. Requisites involve minimum capacity and maximum yield.

Superiority of 100-octane over formerly used 87-91-octane fuel results in approximately 26 per cent more takeoff power, several thousand feet more ceiling, and motor-weight reduction of as much as 40 per cent with consequent pay-load and cruising-radius increase. And we are now looking to better than 100-octane fuels which can be made now with volume reduction.

Economics of aviation-gasoline manufacture varies due to plant sizes and type of processes. Substantial crude throughput is essential and to make it possible for small refineries to contribute, studies have been made of collection of refinery gases, consolidation of polymer gasoline and delivery of charging stock to central catalytic cracking or alkylation units. Central-unit advantages are lower capital investment, lower operating costs and greater output. They can produce up to 10,000 bbl. per day and will provide participants with a plant to meet postwar competition.

Pertinent facts regarding the future include: Limited crude supplies necessitate minimum fuel consumption which can be attained with 100-octane fuel for which motor cars are being designed; the new generation will be a flying age; many planes will be available after the war and world-wide freight and passenger transportation will demand this fuel; nearly all 100-octane production will be located in the United States and these plants will logically supply world demand.

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Procedure for the Issuance, Protest and Amendment of Maximum Price Regulation

—(PROCEDURAL REGULATION NO. 1)

Pursuant to the authority of Sections 201 (d) and 203 (a) of the Emergency Price Control Act of 1942 (Public No. 421, 77th Cong., 2d Sess., Jan. 30, 1942), the following rules are hereby prescribed for the issuance, protest and amendment of maximum-price regulations, price schedules, and temporary maximum-price regulations, and for adjustment or exception pursuant thereto and interpretation thereof:

Rule 1. *Definitions.*—As used in this regulation unless the context otherwise requires:

(*a*) The term "act" means the Emergency Price Control Act of 1942.

(*b*) The term "administrator" means the price administrator of the Office of Price Administration or such person as he may appoint or designate to carry out any of the duties delegated to him by the act.

(*c*) The term "federal register" means the publication provided for by the Act of July 26, 1935 (49 Stat. 500), as amended.

(*d*) The term "maximum price regulation" means any regulation or order establishing a maximum price or prices as defined in Section 302 (*i*) of the act, except that the term shall not include a "price schedule" or "temporary maximum price regulation" as defined below.

(*e*) The term "price schedule" means any price schedule establishing a maximum price or prices issued by the administrator of the Office of Price Administration and Civilian Supply, prior to February 11, 1942, the date upon which the administrator took office under the act.

(*f*) The term "temporary maximum price regulation" means any temporary regulation or order, issued pursuant to Section 2 (*a*) of the act, establishing as a maximum price or prices the price or prices prevailing with respect to any commodity or commodities within 5 days prior to the date of issuance of such temporary regulation or order.

(*g*) The term "date of issuance," with respect to a maximum-price regulation, means the date on which such maximum-price regulation is filed with the Division of the Federal Register.

(*h*) The term "person" includes an individual, corporation, partnership, association, or any other organized group of persons, or legal successor or representative of the foregoing, and includes the United States or any agency thereof, or any other government, or any of its political subdivisions, or any agency of any of the foregoing.

(*i*) The term "protestant" means a person subject to any provision of a maximum-price regulation or price schedule who files a protest against such provision in accordance with Section 203 (*a*) of the act.

(*j*) The term "price hearing" means any formal or informal opportunity to present evidence which may be ordered by the administrator in connection with any action or proceeding related to price control.

COMPLETE TEXT

This is the complete text of OPA's Procedural Regulation No. 1 to Price Schedule 88 which was published complete in the February 12 issue starting on Page 26. Amendment 2 to the price schedule was also published in the February 12 issue. Amendment 1 to the schedule appears here.

Issuance of Maximum-Price Regulations

Rule 2. *Investigation prior to issuance.*—A maximum-price regulation may be issued by the administrator after such studies and investigations as he deems necessary or proper. Before issuing a maximum-price regulation the administrator shall, so far as practicable, advise and consult with representative members of the industry which will be affected by such regulation.

Rule 3. *Price hearing prior to issuance.* — Whenever the administrator deems it necessary or proper that a price hearing be held prior to the issuance of a maximum-price regulation, he may provide for such hearing in accordance with Rules 4 and 5 of this regulation.

Rule 4. *Notice of pre-issuance hearing.* — Notice of any price hearing ordered prior to the issuance of a maximum-price regulation shall be given by publication of such notice in the Federal Register, and may be supplemented by notice given in any other appropriate manner. The notice shall state the time and place of the price hearing and shall contain an appropriate indication of the purposes of such hearing.

Rule 5. *Conduct of pre-issuance hearing.* — A price hearing held prior to the issuance of a maximum-price regulation shall be conducted in such manner, consistent with the need for expeditious action, as will permit the fullest possible presentation of evidence by such persons as are, in the judgment of the administrator, best qualified to provide information with respect to matters considered at the hearing or most likely to be seriously affected by action which may be taken as a result of the hearing.

Rule 6. *Statement of considerations.* — Every maximum-price regulation shall be accompanied by a statement of the considerations involved in its issuance. Such statement may include economic data and other facts of which the administrator has taken official notice and facts found by the administrator as a result of action taken under Section 202 (*a*) of the act.

Rule 7. *Notice of provisions of a maximum-price regulation.*—Notice of the provisions of a maximum-price regulation shall be given by filing such regulation with the Division of the Federal Register. As soon as possible after the filing of such regulation, the administrator shall make copies thereof available to the press.

Rule 8. *Effective date.*—A maximum-price regulation shall become effective 5 days after the date of its issuance, unless an earlier or later date is specified therein.

Protests

Rule 9. *Right to protest.*—Any person subject to any provision of a maximum-price regulation may file a protest against such provision in the manner set forth below. A person is, for the purposes of this regulation, subject to a provision of a maximum-price regulation only if such provision prohibits or requires action by him. Any protest filed by a person not subject to the provision protested may be dismissed by the administrator.

Rule 10. *Action by representative.*—Any action which by this regulation is required of, or permitted to be taken by, a protestant may, unless otherwise expressly stated, be taken on his behalf by any person whom the protestant has by written power of attorney authorized to represent him. Such power of attorney, signed by the protestant, shall be filed with the protest.

Rule 11. *Time and place for filing protests.*—Any protest against a provision of a maximum-price regulation shall be filed with the Secretary, Office of Price Administration, Washington, D. C., within a period of 60 days after the date of issuance of such regulation, regardless of the effective date prescribed therein; *provided*, however, that any protest based solely upon grounds arising after the expiration of 60 days after the date of issuance of a maximum-price regulation may be filed at any time after the grounds for such protest arise.

Rule 12. *Form of protest.*—Every protest shall contain, upon the first page thereof, the number and the date of issuance of the maximum-price regulation against a provision of which the protest is made. One original and four copies of the protest and of all accompanying documents and briefs shall be filed. Each copy shall be printed, typewritten, mimeographed or prepared by a similar process, and shall be plainly legible. Copies shall be double spaced, except that quotations shall be single-spaced and indented.

Rule 13. *Assignment of docket number.* — Upon receipt of a protest it shall be assigned a docket number, of which the protestant shall be notified, and all further papers filed in the proceedings shall contain on the first page thereof the docket number so assigned and the number and date of issuance of the maximum-price regulation protested.

Rule 14. *Contents of protest.* — Every protest shall set forth the following:

(*a*) The name and the post-office address of the protestant, the nature of his business, and the manner in which the protestant is subject to the maximum-price regulation protested.

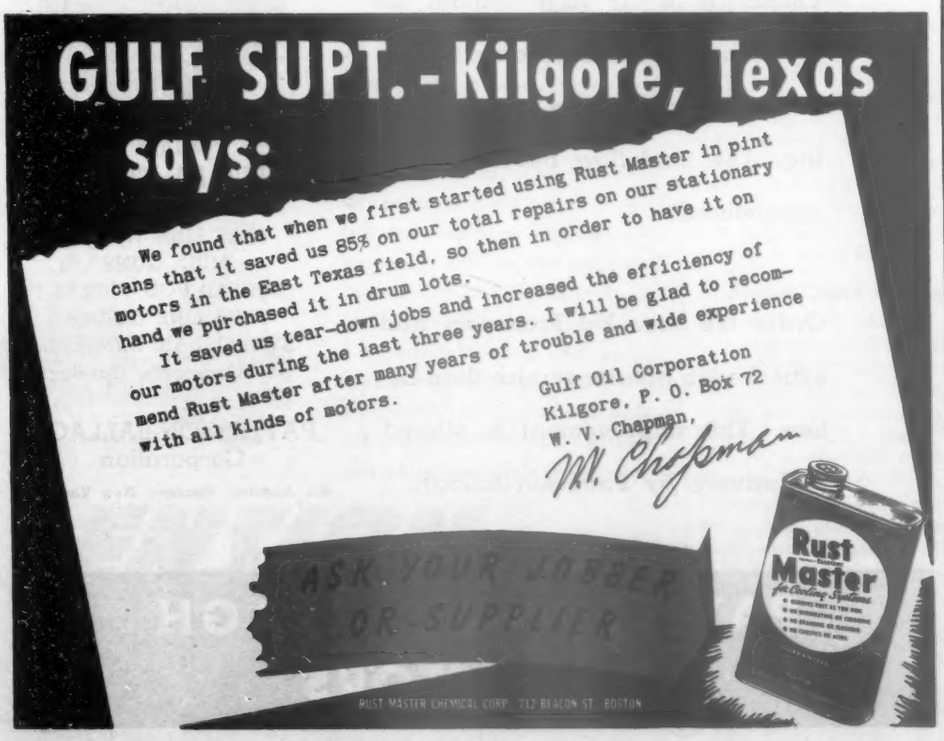
(*b*) The name and post-office address of the person filing the protest on behalf of the protestant and the name and post-office address of the person to whom all communications from the Office of Price Administration relating to the protest shall be sent.

(*c*) A clear and concise statement of all objections raised by the protestant against the provision or provisions protested, each such objection to be separately stated and numbered.

(*d*) A clear and concise statement of all facts alleged in support of the objections.

(*e*) A statement of the relief requested by the protestant including, if the protestant requests modification of a provision of the maximum-price regulation, the specific changes which he seeks to have made in the provision.

(*f*) In cases where the protest is filed on grounds arising after the expiration of 60 days after the issuance of the maximum-price regulation, a clear and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AMENDMENT NO. 1 TO PRICE ORDER NO. 88

TITLE 32—NATIONAL DEFENSE CHAPTER XI—OFFICE OF PRICE ADMINISTRATION

PART 1340—FUEL AMENDMENT NO. 1 TO PRICE SCHEDULE NO. 88*—PETROLEUM AND PETROLEUM PRODUCTS

Section 1340.159 (*b*) (1) is hereby amended to read as follows:

1340.159 Appendix A; maximum prices for petroleum and petroleum products . . .

(*b*) *Petroleum products.* (1) The maximum price on each product sold, contracted to be sold, delivered, or transferred by a seller shall be the lowest quoted price published in the October 2, 1941, issue of Platt's Oilgram and the Chicago Journal of Commerce, the October 8, 1941, issue of the National Petroleum News, or other publications designated by this office, for a product of the same class, kind, type, condition and grade. Where such products are sold and prices are quoted on a delivered basis, then the maximum delivered price shall be the lowest quoted delivered price so published. Where products are sold and prices are quoted on an f.o.b. shipping point basis, then the maximum f.o.b. price shall be the lowest quoted f.o.b. price so published, (E.O. Nos. 8734, 8875, 6 F.R. 1917, 4483).

This amendment No. 1 shall become effective February 5, 1942.

Issued this 5th day of February, 1942.

LEON HENDERSON,
Administrator.

*7 F.R. 718.

concise statement of facts showing the time when such grounds arose.

(*g*) A statement, signed and sworn to by the protestant personally, that the protest and the documents filed herewith are prepared in good faith and that the facts alleged are true to the best of his knowledge, information, and belief. The protestant shall specify which of the facts alleged are known to him to be true and which are alleged on information and belief.

Rule 15. *Affidavits or other written evidence in support of protest.*—Every protestant shall file in conjunction with his protest the following:

(*a*) Affidavits setting forth in full all the evidence, the presentation of which is subject to the control of the protestant, upon which the protestant relies in support of the facts alleged in the protest. Each such affidavit shall state the name, post-office address, and occupation of the affiant; his business connection, if any, with the protestant; and whether the facts set forth in the affidavit are stated from personal knowledge or on information and belief. In every instance, the affiant shall state in detail the sources of his information.

(*b*) A statement by the protestant in affidavit form setting forth in detail the nature and sources of any further evidence, not subject to his control, upon which he believes he can rely in support of the facts alleged in his protest.

(*c*) If necessary, a further statement setting forth the nature and sources of any evidence which the protestant is unable to present solely because of the time limited for the filing of protests and supporting material. Such further statement may contain a request for an opportunity to present such further evidence, which request shall state specifically the amount of time needed for preparation of such evidence.

Rule 16. *Submission of brief by protestant.*—The protestant may file with his protest and accompanying evidential material a brief in support of the objections set forth in the protest. Such brief shall be submitted as a separate document, distinct from the protest and evidential material.

East Coast Stocks Continue Downward Course

WASHINGTON, D. C., Feb. 17.—Stocks of petroleum on the East Coast continued their downward course in the first week of February despite unprecedented use of tank cars in transportation of supplies to that district.

Stocks of crude and refined products on the East Coast totaled 61,606,000 bbl. on February 7, a decline of 2,944,000 bbl., compared to a drop of 2,523,000 bbl. between January 24 and 31. Highest percentage of the East Coast stock decline was in refined products which were 1,877,000 bbl. less on February 7 than on January 31, while crude inventory fell 1,067,000 bbl.

Rail shipments to the East Coast totaled 6,935 cars in the week ended February 7, according to reports of 14 companies made to the OPC. This is an increase of 1,810 cars over the week ended January 31 when 5,125 cars were loaded for eastern shipment.

The railroad movement of approximately 223,000 bbl. of petroleum daily into the East Coast area represents the carrying capacity of about 44 tankers. The average coastwise tanker transportation capacity of 5,000 bbl. daily is based on an average of 20 round trips between Gulf and East Coast ports annually. Tank-car shipments are converted into terms of barrels at the average of 225 bbl. per car.

Tank-car movement of petroleum to the East Coast declined to about 50,000 bbl. daily between the time the British returned 40 tankers last fall and the diversion of coastwise tankers to Pacific Coast and other military services after Pearl Harbor.

East Coast stocks reached a peak of about 82,234,000 bbl. late last November. Since then the decline has been almost constant but sharply accelerated in the past few weeks.

Bolivian Government and Standard Oil Reach Agreement on Terms

WASHINGTON, D. C., Feb. 16.—The Bolivian Government has announced that it reached an agreement on January 27, 1942, with Standard Oil Co. of Bolivia and Standard Oil Co. (New Jersey) which settled the long-standing dispute concerning oil properties and related matters in Bolivia. Text of the agreement is as follows:

"The Government of Bolivia will pay to the Standard Oil Co. (New Jersey) the sum of $1,500,000 at the State Department in Washington for the sale of all of its rights, interests, and properties in Bolivia and those of its subsidiary, Standard Oil Co. of Bolivia, as they existed immediately prior to March 13, 1937, and likewise for the sale of its existing maps and geological studies which are the result of its explorations in Bolivia. This payment will be made with interest at the rate of 3 per cent per annum from March 13, 1937, within 90 days from the date of the supreme resolution of the Republic of Bolivia putting this agreement into effect."

FPC Gathering Data on Available Natural-Gas Supplies

WASHINGTON, D. C., Feb. 16.—The Federal Power Commission today sent questionnaires to every major natural-gas producer, pipe line and distributor to secure, by March 31, information to be used by government agencies in assuring natural-gas supplies to war industries. This survey supplements a less extensive study recently made by FPC and OPM. Companies are asked to submit description of physical properties, actual 1941-42 and estimated 1942-43 figures on system gas balance and system peak day deliverability and demand, transmission-system deliveries, distribution-system sales, major industrial deliveries, and gas reserves and production owned or controlled through purchase contracts.

Bureau of Mines Will Make Aviation-Fuel Studies

WASHINGTON, D. C., Feb. 16.—A special appropriation of $66,000 to enable the Bureau of Mines to make an immediate survey of sources of 100-octane gasoline was recommended by the Senate appropriations committee today and included in the pending first deficiency appropriation bill.

The bureau will make two studies requested by the petroleum coordinator. First is a series of tests to determine the effectiveness of various blends of alkylate, base stock, isopentane, and other materials to aid in immediate plans to utilize most efficiently the various components of 100-octane gasoline. Second study is analysis of recycling plants and condensate fields and their products to determine the quantity and nature of components for use in aviation gasoline and to determine available reserves.

Part of the fund will be used to establish a field office in Pennsylvania to aid producers of Pennsylvania Grade crude in increasing production of aviation lubricants by well cleaning, drilling, and installation of repressuring equipment. Some will also be used to guard and protect the petroleum experiment station at Bartlesville, Okla.

Pacific Coast A.P.I. to Hold Spring Meeting March 10

Following is the complete program of the spring meeting of the Division of Production, Pacific Coast district, of the American Petroleum Institute. The meeting will be held March 10, at the Biltmore Hotel, Los Angeles, Calif.

Morning Session

Presiding: E. C. Babson, chairman of California Topical Committee on Production Practice.

1. "Facts About the Flow of Oil-Water Mixtures Through Surface Equipment," by William Woelflin, Petroleum Rectifying Co. of California, Long Beach, Calif.

2. "Observation and Application of Subsurface Temperatures in Oil and Gas Wells," by C. R. Dale, Technical Oil Tool Corp., Ltd., Los Angeles, Calif.

3. "A Practical Review of the Behavior of Oil and Gas Pools," by C. V. Millikan, Amerada Petroleum Corp., Tulsa.

Afternoon Session

Presiding: Ernest K. Parks, Independent Petroleum Production Engineer, Los Angeles, Calif.

1. A symposium, "California Production of Crude Oil, Gas, and Natural Gasoline for War Effort." The subject will be presented in its various phases by L. L. Aubert, president, Bankline Oil Co., Los Angeles; A. C. Rubel, vice president, Union Oil Co. of California, Los Angeles; P. S. Magruder, assistant manager of gas department, General Petroleum Corp., Los Angeles; John F. Dodge, professor of petroleum engineering, University of Southern California, Los Angeles.

2. A constructive open discussion of the topic under direction of the above speakers.

Evening Session—Dinner

Presiding: Bruce H. Robinson, division superintendent, General Petroleum Corp., Los Angeles.

1. Guest of honor and evening speaker, Tom M. Girdler, chairman of the board, chief executive officer, and director of Republic Steel Corp., Cleveland, Ohio; Consolidated Aircraft Corp., San Diego, Calif., and Vultee Aircraft, Inc., Vultee Field, California; director of Aviation Corp., New York, and director of Goodyear Tire & Rubber Co., Akron, Ohio.

2. Reading of annual reports.

3. Annual election board of directors.

4. Adjournment.

Standard of New Jersey Will Dispose of Gas Utilities

Standard Oil Co. of New Jersey has decided to dispose of its holdings in gas utilities as a result of a ruling by SEC, according to a report. The firm is subject to the provisions of the holding company act. Four subsidiaries are involved, and plans for the disposition of the holdings are to be completed right away.

It is reported the New Jersey company may prorate its utility shares among its own stockholders, as it has done in the past.

Summary of Operations, All Fields, January

SUMMARY OF OPERATIONS, ALL FIELDS, JANUARY

District—	Comp.	Oil	Prod.	Gas	Dry	Completions: Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft.	Footage	Drilling
Appalachian	428	335	753	81	12	9	368	31	20	0	754,427	505
Ohio	120	27	1,260	48	45	27	32	61	0	0	275,628	153
Indiana	50	24	4,413	4	22	7	28	15	0	0	90,616	71
Eastern Kentucky	4	2	8	0	2	1	2	1	0	0	8,426	35
Western Kentucky	20	10	550	0	10	15	4	1	0	0	16,993	27
Michigan	63	36	49,488	9	18	4	30	29	0	0	144,810	123
Illinois	238	163	32,522	2	73	16	53	169	0	0	633,216	187
Kansas	138	92	83,212	9	37	4	31	103	0	0	402,332	163
Nebraska	4	2	260	0	2	0	4	0	0	0	8,716	10
Missouri, Iowa	0	0	0	0	0	0	0	0	0	0	0	0
Oklahoma	140	77	53,010	13	50	14	51	60	15	0	441,056	213
North Texas	174	114	23,466	2	58	39	69	51	15	0	409,559	76
West Central Texas	51	28	3,502	3	20	8	19	24	0	0	116,766	35
Northwest Texas	113	105	104,008	0	8	0	2	39	72	0	546,680	118
Southwest Texas	76	64	68,463	2	10	2	15	52	7	0	265,451	164
Texas Panhandle	73	61	10,798	12	0	0	0	73	0	0	220,679	48
East Texas	57	36	9,994	3	18	2	4	37	14	0	259,675	28
East Texas Border	2	0	0	1	1	0	0	2	0	0	9,482	5
Upper Gulf Coast	94	71	15,047	4	19	0	4	11	74	5	582,354	101
Lower Gulf Coast	69	50	5,645	3	16	0	0	7	62	0	417,567	81
South Central Texas	18	6	23	0	12	11	7	0	0	0	34,125	26
South Texas	74	28	3,105	7	39	2	18	39	15	0	256,501	41
Southeast New Mexico	20	14	1,522	0	6	4	3	13	0	0	55,537	85
Northwest New Mexico	4	4	103	0	0	0	4	0	0	0	6,275	12
Arkansas	13	5	1,443	3	5	1	1	1	10	0	80,631	22
North Louisiana	59	28	2,490	5	26	1	17	34	7	0	193,130	79
Louisiana Gulf	68	46	8,480	0	22	1	2	6	39	20	544,368	90
Mississippi	8	6	2,053	0	2	0	1	5	2	0	36,534	11
Alabama	1	0	0	0	1	1	0	0	0	0	376	1
Georgia	0	0	0	0	0	0	0	0	0	0	0	2
Montana	20	10	964	5	5	4	6	9	1	0	47,822	60
Wyoming	8	6	1,920	1	1	0	0	7	1	0	31,267	60
Colorado	1	0	0	0	1	0	0	0	1	0	5,994	35
Utah	0	0	0	0	0	0	0	0	0	0	0	7
California	106	70	33,745	8	28	2	20	39	41	4	534,976	132
Florida	0	0	0	0	0	0	0	0	0	0	0	1
Total January	2,314	1,520	522,247	225	569	175	795	919	396	29	7,431,989	2,807
Total December	2,436	1,599	549,753	292	545	201	919	955	331	30	7,569,025	3,998
Difference	122	79	27,506	67	24	26	124	36	65	1	137,056	1,191

APPALACHIAN FIELDS

County—	Comp.	Oil	Prod.	Dry	Gas	Drg.
Bradford	202	*202	169	0	0	178
Allegany	108	*108	74	0	0	82
N. Oriskany	2	0	0	1	1	10
Middle District	16	14	13	2	0	10
Butler-Armstrong	1	1	4	0	0	4
SW. Penn.	25	0	0	24	1	54
W. Virginia	74	10	493	54	10	167
Ttl. Jan.	428	335	753	81	12	505
Ttl. Dec.	537	390	531	122	25	602
Difference	109	55	222	41	13	97

*95 input wells in Bradford, 49 in Allegany.

OHIO

Ashland	2	0	0	1	1	4
Athens	7	0	0	2	5	7
Auglaize	1	0	0	0	1	0
Coshocton	3	2	78	0	1	3
Fairfield	2	0	0	1	1	2
Guernsey	1	0	0	1	0	3
Harrison	1	0	0	0	1	1
Holmes	2	1	40	0	1	2
Knox	4	0	0	1	3	11
Licking	10	2	51	5	3	10
Lorain	2	0	0	1	1	2
Medina	13	4	215	6	3	5
Meigs	12	1	1	7	4	7
Monroe	6	3	5	3	0	11
Morgan	4	0	0	1	3	3
Muskingum	10	2	30	6	2	11
Noble	6	2	6	1	3	7
Perry	11	7	748	1	3	14
Stark	4	0	0	2	2	4
Summit	1	0	0	0	1	4
Trumbull	0	0	0	0	0	1
Tuscarawas	5	0	0	3	2	5
Washington	11	2	7	6	3	20
Wayne	1	0	0	0	1	4
Wood	1	1	80	0	0	0
Miscellaneous	0	0	0	0	0	12
Ttl. Jan.	120	27	1,260	48	45	*153
Ttl. Dec.	120	31	704	45	44	234
Difference	0	4	556	3	1	81

*Includes 66 tests which are shut down. Gas: 30,000,000 cu. ft. Recompletions: 1 oil; input wells 2.

EASTERN KENTUCKY

Magoffin	1	1	3	0	0	0
Knott	1	0	0	0	1	8
Elliott	1	1	5	0	0	0
Johnson	1	0	0	0	1	5
Miscellaneous	0	0	0	0	0	22
Ttl. Jan.	4	2	8	0	2	35
Ttl. Dec.	38	6	43	0	32	84
Difference	34	4	35	0	30	49

Gas, 236,000 cu. ft.

WESTERN KENTUCKY

Butler	1	1	10	0	0	0
Daviess	2	1	25	0	1	11
Hancock	3	1	10	0	2	0
Henderson	4	3	390	0	1	1
Ohio	3	1	10	0	2	6
Union	4	3	105	0	1	3
Miscellaneous	3	0	0	0	3	6
Ttl. Jan.	20	10	550	0	10	27
Ttl. Dec.	27	12	507	1	14	40
Difference	7	2	43	1	4	13

INDIANA

Daviess	1	0	0	1	0	2
Gibson	14	8	584	0	6	13
Pike	1	0	0	0	1	5
Posey	18	11	3,597	0	7	11
St. Joseph	1	0	0	0	1	0
Spencer	3	2	175	0	1	13
Sullivan	3	1	30	0	2	6
Wayne	1	0	0	1	0	2
Miscellaneous	8	2	27	2	4	19
Ttl. Jan.	50	24	4,413	4	22	71
Ttl. Dec.	51	29	4,283	4	18	72
Difference	1	5	130	0	4	1

MICHIGAN

Allegan	13	7	877	0	6	17
Arenac	1	1	2,400	0	0	10
Bay	3	3	356	0	0	4
Calhoun	1	0	0	1	0	1
Cass	1	0	0	0	1	2
Clare	12	5	3,235	6	1	7
Gladwin	1	1	65	0	0	5
Lake	3	2	2,575	0	1	1
Missaukee	1	0	0	0	1	0
Montcalm	1	0	0	0	1	1
Mason	1	0	0	0	1	0
Oceana	1	0	0	0	1	2
Osceola	10	8	33,086	2	0	19
Ottawa	1	0	0	0	1	3
Roscommon	6	5	6,714	0	1	9
St. Clair	1	0	0	0	1	1
Saginaw	1	0	0	0	1	1
Tuscola	1	0	0	0	1	5
Van Buren	4	4	180	0	0	5
Miscellaneous	0	0	0	0	0	30
Ttl. Jan.	63	36	49,488	9	18	123
Ttl. Dec.	98	55	115,892	13	30	162
Difference	35	19	66,404	4	12	39

ILLINOIS

	Comp.	Oil	Prod.	Gas	Dry	Dig.
Allendale	1	1	65	0	0	0
Alma	1	1	15	0	0	0
Benton	2	1	80	0	1	0
Bone Gap	1	1	100	0	0	0
Boyleston	1	1	40	0	0	2
Centralia	1	1	10	0	0	0
Clay City	3	3	471	0	0	0
Cook's Mills	1	0	0	0	1	0
Dahlgren	1	0	0	0	1	0
Dale	8	8	2,363	0	0	5
Dix	1	1	50	0	0	0
Dubois	1	1	19	0	0	0
Dundas	4	4	470	0	0	3
Dupo	5	5	155	0	0	0
E. Centerville	4	3	884	0	1	6
Epworth	2	2	175	0	0	0
Grayville W.	1	0	0	0	1	0
Fairfield	2	2	614	0	0	0
Griffin	2	2	310	0	0	0
Hoodville	1	1	58	0	0	2
Inman	1	0	0	0	1	1
Inman East	1	1	40	0	0	1
Iron	2	2	306	0	0	1
Johnsonville	21	19	3,398	0	2	8
Keensburg	2	1	52	0	1	2
Louden	5	4	282	0	1	7
Mill Shoals	14	12	1,174	0	2	3
Mount Carmel	4	4	640	0	0	0
New Harmony	12	11	994	0	1	7
Noble	1	1	116	0	0	1
N. Benton	1	1	76	0	0	1
Parkersburg	4	3	1,803	0	1	0
Patton	2	1	15	0	1	1
Rising Sun	4	3	213	0	1	2
Roland	5	5	618	0	0	7
Rural Hill	28	24	9,798	0	4	27
Russellville	2	0	0	2	0	0
Sailor Springs	4	1	12	0	3	0
St. Francesville E.	2	2	109	0	0	0
Ste. Marie	2	1	250	0	1	2
St. Paul	2	2	132	0	0	0
Simms	7	7	936	0	0	5
Stokes	1	1	751	0	0	0
Stringtown	1	1	33	0	0	1
Walpole	1	1	317	0	0	1
W. Centralia	2	2	140	0	0	0
W. Clay City	6	4	3,421	0	2	3
Woburn	1	1	3	0	0	0
Woodlawn	8	5	441	0	3	2
Wilcats	49	5	573	0	44	73
Miscellaneous	0	0	0	0	0	13
Ttl. Jan.	238	163	32,522	2	73	*187
Ttl. Dec.	247	169	47,304	1	77	363
Difference	9	6	14,782	1	4	176

*Drilling 34, rigs standing 157.

KANSAS

Ainsworth	1	1	82	0	0	1
N. W. Ainsworth	1	1	417	0	0	1
Beaumont	1	0	0	0	1	1
Bedford	2	1	150	0	1	1
Bemis	4	4	7,250	0	0	1
S. Big Creek	1	1	89	0	0	1
Bloomer	3	1	3,000	0	2	2
Burnett	1	1	69	0	0	1
Chase	4	3	3,381	0	1	1
Chindberg	1	0	0	0	1	0
Couch	1	1	656	0	1	1
Cunningham	2	1	864	1	0	7
N. E. Davidson	1	1	233	0	0	0
Dayton	1	1	1,673	0	0	0
Eberhardt	1	0	0	0	1	1
Eldorado	5	5	97	0	0	0
Forest Hills	2	1	410	0	1	0
Frog Hollow	1	1	956	0	0	5
E. Frog Hollow	2	2	1,111	0	0	0
Geneseo	2	2	6,000	0	0	0
Gorham	1	1	421	0	0	0
Greenvale	2	2	169	0	0	5
Gustason	1	1	240	0	0	0
Hall-Gurney	4	4	4,413	0	0	5
Haverhill	1	1	35	0	0	0
Henne	1	1	886	0	0	0
Kipp	1	1	2,051	0	0	0
Kowalsky*	1	1	51	0	0	0
Kraft-Prusa	7	5	5,591	0	2	5
E. Kraft-Prusa*	1	1	544	0	0	1
Lamont	1	1	5	0	0	0
S. W. Lake City*	1	1	14	0	0	0
Laton	1	1	244	0	0	0
Lost Springs	2	2	578	0	0	2
McLouth	10	2	240	6	2	8
Morel	1	1	1,551	0	0	0
New Salem*	1	1	265	0	0	0
Niedenthal	1	1	1,365	0	0	0
Peace Creek	3	3	6,328	0	0	1
N. E. Peace Creek	2	2	6,000	0	0	2
Ray	3	3	5,932	0	0	1
N. Ray*	1	1	61	0	0	0
Raymond	1	1	46	0	0	2
Ritz	1	1	10	0	0	0
Rusch	1	1	102	0	0	0
Severy	2	1	5	0	1	1
Silica	6	4	8,716	0	2	1
W. Silica	1	1	447	0	0	3
Soeken	1	1	3,000	0	0	0
St. John	1	0	0	0	1	0
Stafford	1	1	3,000	0	0	1
Sugarloaf	1	0	0	0	1	0
Trapp	6	6	3,502	0	0	6
W. Trapp	1	1	27	0	0	0
Virgil	1	1	35	0	0	1
Voshel	1	1	138	0	0	0
Wellman	1	0	0	1	0	0
E. Wherry	2	2	250	0	0	1
Wilkins	1	0	0	0	1	0
Zenith	1	1	235	0	0	6
Zyba	1	1	214	0	0	1
Miscellaneous:						
Butler	1	1	25	0	0	0
Greenwood	2	2	38	0	0	0
Other	0	0	0	0	0	45
Wildcats	19	0	0	0	19	41
Ttl. Jan.	138	92	83,212	9	37	163
Ttl. Dec.	148	91	94,492	11	46	260
Difference	10	1	11,280	2	9	97

*Discovery.

OKLAHOMA

Ada	1	0	0	0	1	3
Apache	7	7	43,684	0	0	7
N. Bebee	1	1	504	0	0	0
Blackwell	2	1	20	0	1	0
Burbank	1	1	19	0	0	0
S. Burbank	1	1	122	0	0	0
Cement	2	1	41	0	1	2
Chickasha	1	0	0	0	1	1
Coyle	1	1	313	0	0	0
E. Cromwell	4	4	160	0	0	3
Depew	1	1	152	0	0	0
Dilworth	3	3	258	0	0	2
Dora	1	0	0	0	1	0
Doyle	1	1	145	0	0	0
S. Earlsboro	1	1	215	0	0	2
W. Earlsboro	1	1	175	0	0	0
Empire	2	2	165	0	0	2
Fish	1	0	0	0	1	0
Frederick	1	1	25	0	0	0
Garber	1	1	10	0	0	3
Guthrie	1	1	28	0	0	0
W. Hewitt	1	1	30	0	0	6
W. Holdenville	1	1	20	0	0	2
Hotulke	3	3	654	0	0	7
W. Hotulke	2	2	838	0	0	0
Keokuk	1	1	285	0	0	0
Laffoon	1	0	0	1	0	0
Little River	1	1	50	0	0	0
W. Loco*	3	1	78	0	2	4
S. Maud	1	1	131	0	0	0
N. E. Mehan	1	1	424	0	0	0
W. Okemah	2	0	0	2	0	0
Oklahoma City	6	4	1,513	0	2	14
Peck	1	1	96	0	0	0
Sasakwa	4	3	27	0	1	2
E. Sporn*	1	1	35	0	0	0
St. Louis	0	0	0	0	0	5
N. St. Louis	1	1	571	0	0	2
E. Tecumseh	1	1	175	0	0	0
Tussy	2	2	265	0	0	3
Velma	5	4	41	1	0	1
Weleetka	2	2	137	0	0	0
Wetumka	1	1	85	0	0	0
N.E. Wewoka	1	0	0	0	1	0
S. Woolsey*	3	2	950	0	1	2
Miscellaneous:						
Creek	7	5	287	1	1	0
Hughes	2	0	0	2	0	0
LeFlore	1	0	0	1	0	0
Muskogee	5	2	25	0	3	0
Okfuskee	2	0	0	0	2	0
Okmulgee	6	2	23	1	3	0
Osage	13	4	209	1	8	18
Pawnee	1	0	0	0	1	4
Pontotoc	2	1	25	0	1	0
Tulsa	6	0	0	2	4	3
Wagoner	2	0	0	1	1	0
Others	0	0	0	0	0	65
Wildcats	13	0	0	0	13	50
Ttl. Jan.	140	77	53,010	13	50	213
Ttl. Dec.	191	105	36,013	13	73	296
Difference	51	28	19,997	0	23	83

NORTH TEXAS

Allar	1	0	0	0	1	0
Antelope	4	4	524	0	0	5
Anzac-Graham	1	1	46	0	0	1
Briar Creek	1	1	58	0	0	0
Benson	1	1	275	0	0	1
Bryson	2	0	0	0	2	1
Burns-Larimore	1	1	15	0	0	1
Fargo	1	1	175	0	0	1
Harrold	2	2	445	0	0	0
Hoefle	1	1	800	0	0	2
Housley-McCord	4	3	119	0	1	0
Hull-Silk	3	3	159	0	1	5
K.M.A.	35	31	13,296	0	4	6
McKnight	1	0	0	0	1	1
Mankins	2	1	41	0	1	1
Mathis	2	2	117	0	0	0
New York City	2	2	2,100	0	0	3
N. Knox (Caddo)	1	0	0	1	0	1

	Comp.	Oil	Prod.	Dry	Gas	Drg.
Rock Crossing (Ellen.)	1	1	275	0	0	0
Rogers & Rogers	1	1	600	0	0	2
Sewell	1	1	200	0	0	1
Scotland	2	2	985	0	0	3
S. Electra	1	0	0	0	1	1
Voth	1	0	0	0	1	0
Walnut Bend	2	2	295	0	0	2
Wilson	2	2	70	0	0	1
Wildcats*	15	5	1,270	0	10	14
Misc. fields:						
Archer	13	5	68	0	8	5
Clay	24	16	635	1	7	6
Cooke	5	4	103	0	1	1
Jack	2	1	120	0	1	2
Montague	0	0	0	0	0	3
Throckmorton	9	4	105	0	5	3
Wichita	14	8	140	0	6	1
Wilbarger	3	3	130	0	0	0
Young	13	6	40	0	7	2
Subtotal	174	114	23,206	2	58	76

*Humble-McKnight, Throckmorton; Continental-Spring, Clay; Kerlyn and Phillips-Garvey, Young; Gibson and Jennings-Howard, Montague; Shell-Williams, Clay.

WEST CENTRAL TEXAS

Akard	1	1	100	0	0	1
Amity	2	2	44	0	0	1
Bluff Creek	1	1	15	0	0	0
Cook	2	2	238	0	0	1
Jim Ned	3	2	384	1	0	2
Lewis	1	0	0	0	1	1
Merkel	1	1	650	0	0	2
McCaulley	4	4	277	0	0	1
Nail	1	1	69	0	0	0
Salt Creek	1	0	0	1	0	1
Scranton	1	1	100	0	0	2
Shackelford	2	0	0	0	2	1
Silver Valley	3	2	137	0	1	3
Strawn	1	0	0	0	1	0
Wimberly	4	4	941	0	0	2
Wildcats*	23	7	547	1	15	17
Subtotal	51	28	3,502	3	20	35
Ttl. Jan.	225	142	26,708	5	78	111
Ttl. Dec.	175	109	12,320	5	61	288
Difference	50	23	14,388	0	17	177

*Hunter-Anderson, Taylor; Lawson-Rose, Haskell; Hamer-Smith, Comanche; Dodson-Wilson, Concho; Daniel-Black, Stephens; Hendrickson and Milner-Clyburn, Jones; Humble-Graves, Jones; Merry Bros. & Perini-Greer, Coleman.

NORTHERN WEST TEXAS

Cedar Lake	5	5	2,967	0	0	3
Emma	2	2	1,998	0	0	2
Iatan	4	4	941	0	0	7
Seminole	3	3	1,842	0	0	2
Sharon Ridge	2	2	214	0	0	5
Slaughter	71	71	85,441	0	0	70
Wasson	14	14	8,487	0	0	13
W. Andrews	2	2	1,490	0	0	1
Wildcats*	10	2	631	0	8	13
Misc. fields	0	0	0	0	0	2
Subtotal	113	105	104,008	0	8	118

*Albaugh-Handley, Lubbock County. Beig-Wright, Cochran County.

SOUTHERN WEST TEXAS

Abell	5	5	5,527	0	0	20
Abell Permian	2	2	760	0	0	3
Apco-Warner	2	2	745	0	0	4
Crockett	1	1	100	0	0	5
Dune	1	1	302	0	0	1
Emperor	1	1	476	0	0	1
Foster	6	6	12,350	0	0	8
Goldsmith	3	3	8,550	0	0	5
Johnson	3	2	1,550	0	1	7
Jordan	2	2	1,142	0	0	2
Keystone	10	10	3,171	0	0	15
Kermit	5	3	977	1	1	3
Lehn	2	0	0	0	2	2
McCamey	1	1	82	0	0	2
McElroy	3	3	2,962	0	0	5
N. Cowden	6	6	3,867	0	0	10
N. Ward	1	1	1,501	0	0	4
Pecos Valley	1	1	9	0	0	2
Sand Hills	3	3	1,181	0	0	10
Shearer	1	1	146	0	0	1
Shepley	1	1	102	0	0	2
Toborg	2	2	48	0	0	0
Taylor Link	3	2	115	0	1	3
White & Baker	1	0	0	1	0	1
Waddell	3	3	22,677	0	0	2
Walker	2	1	100	0	1	5
World	1	0	0	0	1	1
Wildcats*	4	1	23	0	3	23
Misc. fields	0	0	0	0	0	17
Subtotal	76	64	68,463	2	10	164
Ttl. Jan.	189	169	172,471	2	18	282
Ttl. Dec.	160	142	111,684	3	15	340
Difference	29	27	60,787	1	3	58

*Stanolind and Superior-Thrapp-Walker, Pecos.

EAST TEXAS BORDER

Logansport	1	0	0	1	0	1
Wildcats	1	0	0	0	1	2
Miscellaneous	0	0	0	0	0	2
Ttl. Jan.	2	0	0	1	1	5
Ttl. Dec.	2	1	100	0	1	11
Difference	0	1	100	1	0	6

TEXAS PANHANDLE

	Comp.	Oil	Prod.	Dry	Gas	Drg.
Carson	9	7	1,352	2	0	3
Gray	29	28	5,391	1	0	11
Hutchinson	26	23	3,961	3	0	23
Moore	5	0	0	5	0	7
Wheeler	4	3	94	1	0	4
Ttl. Jan.	73	61	10,798	12	0	48
Ttl. Dec.	66	54	10,283	6	6	70
Difference	7	7	515	6	6	22

EAST TEXAS

E. Texas field (hourly production)						
Longview	2	2	116	0	0	0
Joiner	1	1	40	0	0	1
Chapel Hill	2	2	1,075	0	0	6
E. Long Lake	1	1	49	0	0	0
Flag Lake*	1	0	0	1	0	0
Grapeland*	1	0	0	1	0	1
Hawkins	26	26	8,097	0	0	9
Long Lake*	3	2	186	1	0	2
Pleasant Grove	1	1	353	0	0	1
Talco	1	1	78	0	0	0
Wildcats	18	0	0	0	18	8
Ttl. Jan.	57	36	9,994	3	18	28
Ttl. Dec.	45	34	9,894	3	8	76
Difference	12	12	100	0	10	48

Gas production: *Long Lake, 40,000,000 cu. ft.; Flag Lake, 1,200,000 cu. ft.; Grapeland, 10,000,000 cu. ft.

TEXAS GULF COAST

Anahuac	1	1	662	0	0	0
Bammel	1	0	0	1	0	0
Camp Eleven	1	1	612	0	0	0
Chocolate Bayou	1	1	194	0	0	0
Clodine	2	2	158	0	0	0
Conroe	5	1	156	0	4	0
Danbury	2	1	90	0	1	0
Dyersdale	5	5	1,171	0	0	0
Esperson	1	0	0	1	0	0
Fannett	1	1	202	0	0	0
Fig Ridge	1	1	415	0	0	0
Ganado	3	3	477	0	0	0
Goodrich	1	0	0	0	1	0
Hull	2	2	438	0	0	0
Lolita	5	5	631	0	0	0
Lake Creek	1	1	408	0	0	0
Looney's Creek	1	1	115	0	0	0
Lovells Lake	1	1	148	0	0	0
Magnet	3	2	105	0	1	0
Manvel	1	0	0	0	1	0
Maurbro	6	6	2,742	0	0	0
Mercy	1	1	583	0	0	0
Mykawa	1	1	70	0	0	0
Needville	1	1	244	0	0	0
Nome	1	0	0	1	0	0
N. La Ward	9	8	1,689	0	1	0
N. Markham	2	2	415	0	0	0
Old Ocean	1	1	508	0	0	0
Ogburn	1	0	0	1	0	0
Orange	1	1	24	0	0	0
Oyster Bayou	1	1	310	0	0	0
Pierce Junction	1	1	105	0	0	0
Port Neches	1	0	0	0	1	0
Provident City	1	1	90	0	0	0
Tomball	1	1	29	0	0	0
W. Beaumont	1	1	70	0	0	0
W. Columbia	2	1	341	0	1	0
W. Ranch	7	7	813	0	0	0
Withers	8	8	1,032	0	0	0
Miscellaneous	8	0	0	0	8	101
Ttl. Jan.	94	71	15,047	4	19	101
Ttl. Dec.	72	65	14,018	1	6	141
Difference	22	6	1,029	3	13	40

LOWER GULF COAST

Agua Dulce	11	9	1,534	1	1	12
Ben Bolt	3	1	240	0	2	3
Clara Driscoll	1	1	127	0	0	1
Coleto Creek	1	0	0	1	0	0
E. Placedo	1	1	84	0	0	2
Fagan	3	3	265	0	0	1
Greta	2	2	150	0	0	1
Henshaw	1	1	25	0	0	0
Kingsville	1	1	50	0	0	0
La Gloria	1	1	280	0	0	3
McAllen	1	0	0	1	0	0
McFaddin	1	1	218	0	0	1
Midway	2	2	176	0	0	1
Minnie Bock	3	2	75	0	1	2
Odem	2	2	224	0	0	4
Orange Grove	1	1	90	0	0	0
Petronilla	2	1	155	0	1	1
Plymouth	2	2	317	0	0	0
Refugio	2	2	132	0	0	1
Richard King	2	2	151	0	0	1
Seeligson	4	4	553	0	0	6
S. Sinton	1	1	66	0	0	0
Stratton	9	9	1,685	0	0	12
Victoria	1	1	48	0	0	0
W. Alfred	1	0	0	0	1	0
Miscellaneous	10	0	0	0	10	29
Ttl. Jan.	69	50	6,645	3	16	81
Ttl. Dec.	48	34	4,357	2	12	86
Difference	21	16	1,288	1	4	5

SOUTH TEXAS

Casa Blanca	2	2	161	0	0	1
Colorado	7	5	682	0	2	3
Cuellar	1	0	0	0	1	0
Driscoll	1	1	158	0	0	1
E. Benavides	1	0	0	1	0	0
E. Cole	2	2	32	0	0	0
Government Wells	1	1	123	0	0	0
Glen	1	0	0	0	1	1
Hoffman	1	1	45	0	0	1
Hordes Creek	1	0	0	1	0	0
Jacobs	1	0	0	0	1	0
Killam	1	0	0	1	0	1
Kreis	3	1	30	0	2	0
Las Animas	2	2	40	0	0	0
McLean	1	1	288	0	0	2
Neuhaus	2	1	75	0	1	0
N. Rincon	1	0	0	1	0	1
N. Sun	1	1	121	0	0	1
Piedra De Lumbre	1	0	0	0	1	0
Peters	2	0	0	1	1	0
Rincon	6	6	1,069	0	0	1
Sejita	2	0	0	2	0	1
S. White Creek	4	0	0	0	4	1
Seven Sisters	2	1	33	0	1	0
Sun	3	0	0	0	3	1
S. Campana	1	1	38	0	0	2
Yturria	2	2	210	0	0	2
Miscellaneous	21	0	0	0	21	21
Ttl. Jan.	74	28	3,105	7	39	41
Ttl. Dec.	67	42	5,001	2	23	77
Difference	7	14	2,896	5	16	36

SOUTH CENTRAL TEXAS

Buchanan	1	1	11	0	0	0
Carrizo	1	0	0	0	1	0
Chicon Lake	2	2	6	0	0	0
Dale	1	0	0	0	1	0
Floresville	2	0	0	0	2	0
Gas Ridge	5	3	6	0	2	3
Lentz	1	0	0	0	1	0
Miscellaneous	5	0	0	0	5	26
Ttl. Jan.	18	6	23	0	12	26
Ttl. Dec.	24	13	626	2	9	53
Difference	6	7	603	2	3	27

SOUTHEAST NEW MEXICO

Maljamar	5	5	465	0	0	0
Monument				0	1	0
N. Grayburg	4	3	404	0	1	0
Red Lakes	4	2	50	0	2	0
Salt Lake	1	1	233	0	0	0
Wildcats	5	3	370	0	2	0
Ttl. Jan.	20	14	1,522	0	6	85
Ttl. Dec.	15	12	1,423	0	3	49
Difference	5	2	99	0	3	36

ARKANSAS

Atlantic	1	1	519	0	0	0
Buckner	1	1	104	0	0	0
Dorcheat	1	0	0	1	0	1
E. Schuler	3	1	125	0	2	2
Macedonia	2	0	0	2	0	2
Patton	1	0	0	0	1	0
Smackover	1	1	52	0	0	1
Wildcats	3	1	693	0	2	7
Miscellaneous	0	0	0	0	0	11
Ttl. Jan.	13	5	1,443	3	5	24
Ttl. Dec.	10	4	431	3	3	28
Difference	3	1	1,012	0	2	4

Gas production: Macedonia, 6,000,000 cu. ft.; Dorcheat, 1,176,000 cu. ft.

MISSISSIPPI

Tinsley	7	6	2,053	0	1	4
Wildcats	1	0	0	0	1	5
Miscellaneous	0	0	0	0	0	2
Ttl. Jan.	8	6	2,053	0	2	11
Ttl. Dec.	30	24	10,344	0	6	25
Difference	22	18	8,291	0	4	14

NORTH LOUISIANA

Bellevue	1	1	5	0	0	1
Caddo	10	6	123	0	4	11
Converse	1	1	25	0	0	1
Carterville	2	1	10	0	1	1
Cypress Bayou	1	0	0	0	1	1
Homer	1	1	12	0	0	0
Little Creek	5	5	578	0	0	5
Logansport	1	0	0	1	0	1
Monroe	3	0	0	3	0	4
Nebo	15	11	1,563	1	3	18
Olla	2	0	0	0	2	5
Pleasant Hill	1	0	0	0	1	0
Sligo	1	1	30	0	0	1
Trout Creek	1	0	0	0	1	0
Wildcats	14	1	144	0	13	18
Miscellaneous	0	0	0	0	0	12
Ttl. Jan.	59	28	2,490	5	26	79
Ttl. Dec.	90	47	5,116	10	33	96
Difference	31	19	2,626	5	7	17

Gas production: Monroe, 12,650,000 cu. ft.; Nebo, 36,000,000 cu. ft.; Longansport, 120,000,000 cu. ft.

LOUISIANA GULF COAST

Anse La Butte	6	6	137	0	0	0
Bayou Blue	2	2	155	0	0	0
Bayou Des Allemands	1	1	102	0	0	0
Bayou Sale	3	2	522	0	1	0
Belle Isle	1	0	0	0	1	0
Bosco	1	1	30	0	0	0
Cameron Meadows	2	0	0	0	2	0
Chacahoula	2	2	365	0	0	0
Delta Farms	1	0	0	0	1	0
E. Hackberry	2	2	339	0	0	0
Fausse Point	1	0	0	0	1	0
Garden Island	2	2	283	0	0	0
Golden Meadow	1	1	65	0	0	0
Gueydan	2	2	452	0	0	0
Horseshoe Bayou	1	1	296	0	0	0
Iowa	2	2	372	0	0	0
Leeville	1	1	178	0	0	0
Neale	1	1	186	0	0	0
New Iberia	3	2	465	0	1	0
N. Crowley	2	2	914	0	0	0
Paradis	1	1	503	0	0	0
Port Allen	2	1	228	0	0	0
Port Barre	3	2	272	0	1	0
Richie	1	1	52	0	0	0
Schooner Bayou	1	1	312	0	0	0
St. Gabriel	1	1	216	0	0	0
University	1	1	194	0	0	0
Venice	1	1	210	0	0	0
Ville Platte	4	3	761	0	1	0
Vinton	3	2	280	0	1	0
W. Hackberry	2	2	561	0	0	0
Miscellaneous	12	0	0	0	12	90
Ttl. Jan.	68	46	8,480	0	22	90
Ttl. Dec.	58	48	11,683	0	10	140
Difference	10	2	3,203	0	12	50

MONTANA

Bowdoin	5	0	0	5	0	13
Cat Creek	1	0	0	0	1	0
Cedar Creek	1	0	0	0	1	0
Cut Bank	9	8	639	0	1	0
Kevin-Sunburst	4	2	325	0	2	22
Miscellaneous	0	0	0	0	0	16
Ttl. Jan.	20	10	964	5	5	60
Ttl. Dec.	30	13	2,527	12	5	73
Difference	10	3	1,563	7	0	13

WYOMING

Cole Creek	1	1	120	0	0	0
Frannie	1	1	283	0	0	2
Lost Soldier	1	1	247	0	0	1
Oregon Basin	1	1	465	0	0	0
Rock River	1	1	205	0	0	0
Shawnee	1	0	0	0	1	0
S. Elk Basin	1	0	0	1	0	0
Wertz	1	1	600	0	0	4
Miscellaneous	0	0	0	0	0	53
Ttl. Jan.	8	6	1,920	1	1	60
Ttl. Dec.	3	2	673	0	1	67
Difference	5	4	1,247	1	0	7

COLORADO

South Towner	1	0	0	0	1	0
Miscellaneous	0	0	0	0	0	35
Ttl. Jan.	1	0	0	0	1	35
Ttl. Dec.	3	2	1,753	0	1	38
Difference	2	2	1,753	0	0	3

NORTHWEST NEW MEXICO

Hospah	4	4	103	0	0	3
Miscellaneous	0	0	0	0	0	9
Ttl. Jan.	4	4	103	0	0	12
Ttl. Dec.	3	1	40	1	1	10
Difference	1	3	63	1	1	2

CALIFORNIA

Arvin	1	1	80	0	0	0
Belridge, N.	1	1	75	0	0	1
Belridge, S.	1	1	25	0	0	0
Coalinga	4	4	6,451	0	0	5
Coles Levee	0	0	0	0	0	2
Coyote, E.	1	0	0	0	1	1
Coyote, W.	1	1	677	0	0	1
Dominguez	2	1	544	0	1	1
Edison	4	2	242	0	2	0
Elk Hills	3	2	397	1	0	4
Greeley	1	1	1,005	0	0	6
Huntington Beach	3	3	1,261	0	0	2
Inglewood	3	2	3,087	0	1	1
Jacalitos	1	1	103	0	0	2
Kern River	1	1	70	0	0	1
Kettleman N. Dome	3	3	1,589	0	0	8
Long Beach	3	3	120	0	2	1
Midway-Sunset	2	1	35	0	1	3
Mount Poso	8	6	568	0	2	1
Potrero	1	1	325	0	0	0
Raisin City	3	1	450	1	1	0
Rio Bravo	2	2	2,820	0	0	2
Rio Vista	4	0	0	4	0	1
Rosecrans	3	2	290	0	1	1
Round Mountain	1	0	0	0	1	0
San Miguelito	1	1	784	0	0	0
Santa Maria	1	1	475	0	0	5
Santa Maria Valley	11	10	4,816	0	1	3
Strand	1	1	656	0	0	0
Ten Section	2	2	1,070	0	0	0
Torrance	3	3	248	0	0	2
Tupman	2	2	3,947	0	0	4
Union Avenue	0	0	0	0	0	2
Ventura Ave.	2	2	1,670	0	0	7
Ventura-Newhall	8	1	73	1	6	16
Whittier	1	0	0	1	0	0
Wilmington	9	9	3,790	0	0	8
Wildcats	8	0	0	0	8	31
Miscellaneous	0	0	0	0	0	12
Ttl. Jan.	106	70	33,745	8	28	132
Ttl. Dec.	68	62	45,428	3	3	170
Difference	38	8	11,683	5	25	38

Personal Paragraphs

R. S. PRINGLE, JR., D. B. TANNER, and GEORGE H. DANA, independent oil producers, Bradford, Pa., have been selected by the Bradford District Pennsylvania Oil Producers Association as a committee to direct to collection of scrap iron and junk in the Bradford district oil fields.

C. R. WAGNER, chief chemist, Pure Oil Co. in charge of research, has accepted an invitation to join the staff of the Director of Refining of the Office of Petroleum Coordinator. He expects to be located in Washington for the duration of the war. DR. L. M. HENDERSON, of the Pure company's staff, will take over Mr. Wagner's duties as secretary of the petroleum division of the American Chemical Society.

LT. MARION E. THOMAS, geologist for Phillips Petroleum Co., now in service, has been transferred from Fort Monmouth, Red Bank, N. J., to Drew Field, Tampa, Fla.

A. L. QUACKENBOSS, of Union Oil Co., has been granted a leave of absence to assist the Navy Contact Subcommittee of the Transportation Committee for the Pacific Coast.

CAPT. MICHAEL T. HALBOUTY, consulting geologist and engineer, Houston, Tex., left last week for Fort Benning, Ga., to report to the battalion commander and staff officers school for 3 months of training. A permanent assignment will be made upon completion of training.

E. J. REASER, farm boss, Continental Oil Co., in the Ville Platte field, Evangeline Parish, Louisiana, has been made district production foreman for the Tepetate field, Acadia Parish. W. M. FEASTER, head roustabout at Ville Platte, has been promoted to production farm boss.

R. R. NEWMAN has been elected vice president in charge of manufacturing for Frontier Refining Co., whose refinery is located at Cheyenne, Wyo., and whose general office is at Denver, Colo. Mr. Newman recently resigned as general superintendent for Bay Petroleum Corp., Denver. Previous to his association with Bay Petroleum, Mr. Newman was superintendent of Independent Refining Co., Laurel, Mont.; superintendent of Old Dutch Refining Co., Muskegon, Mich., and for 15 years before these connections, was with several major companies.

J. R. THOMAS and GLENN E. HENDERSON were the guest speakers at the February meeting of Los Angeles Basin chapter, A.P.I., and they discussed in a joint paper "The Economics of Pumping Units."

GUY A. TOMPSON, who has been connected with the procurement division of the War Production Board with headquarters in Washington for the past 6 months, has completed his work there and has returned to Tulsa to resume his duties as vice president and general manager of the Bethlehem Supply Co.

STANLEY B. WHITE, geologist, Ohio Oil Co., Tulsa, has been transferred to the home office of the company at Findlay, Ohio, as geological adviser for the Mid-Continent area. He will be working under WILSON B. EMERY at Findlay. Mr. White came to the United States 20 years ago on graduation from a school of mines in Cornwall, England. He has been with Ohio Oil Co. since 1930, having previously been associated with the former Transcontinental Oil Co., which Ohio acquired. MAURICE TEIS, formerly with E. H. Moore, Inc., Tulsa, shortly will join Ohio Oil Co.'s geological department at Tulsa to succeed Mr. White.

WILLIAM FORAN, who has recently returned to Los Angeles, Calif., from Texas and who was forced home from the Far East by the advent of war, addressed the Town Hall last week, pointing out the condition of petroleum in Germany and Italy. HARRY JOHNSON, Los Angeles consulting geologist, has been appointed general chairman of a reorganized major disaster and civilian defense committee of Town Hall.

H. BLOEMGARTEN has been named to take charge of exploration and production activities in the president's office of Shell Oil Co., Inc., in New York. Mr. Bloemgarten has been making an extensive tour of Shell's production fields.

G. E. (POP) MABRY, publicity manager of the Humble Oil & Refining Co., Houston, Tex., a reserve officer in the Quartermaster Corps of the U. S. Army, has been called to active service and he is scheduled to leave February 19 for Cheyenne, Wyo.

W. M. V. ASH has been named to succeed R. S. MITCHELL in the president's office of Shell Oil Co., Inc., at New York. Mr. Ash is from the Pacific Coast organization where during the past 5 years he has served as assistant to the vice president in charge of exploration and production activities.

WILLIAM F. HUMPHREY, president of Tide Water Associated Oil Co., Los Angeles, Calif., has announced that the board of directors of the company has authorized a subscription of $25,000 to the nationwide war fund drive of the American Red Cross. Of this amount, $3,500 has been allocated to the Los Angeles chapter.

ANTUM E. CUTHRELL, drilling superintendent for the Standard Oil Co. of Argentina, with headquarters at Buenos Aires, arrived in Houston last week where he will spend several weeks vacationing and visiting among his friends in the Gulf Coast district. He is accompanied by his wife and their two children. Mr. Cuthrell was formerly with Humble Oil & Refining Co., and resigned in 1938 to join the Argentine company as petroleum engineer.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

Scarcity of pipe, high prices of materials, and cold weather combine to force general curtailment of drilling operations over the country.

German submarine attacks in the Atlantic Ocean threaten cessation of American oil shipments by tankers. Standard Oil Co. orders all its ships to port.

Peoples Gas Co. to deepen its Geary wildcat in Washington County, Pennsylvania, deepest cable-drilled hole in the world, from present depth of 7,214 ft. Within several months, the 7,300-ft. depth of the world's deepest test of any kind, located in Rumania, is expected to be reached.

United Western Oil Co., which recently passed control to large New York interests affiliated with the Ohio Oil Co., obtains 40,000 acres in new Kansas fields.

20 YEARS AGO

Seminole field, Seminole County, Oklahoma, passes 300,000-bbl.-per-day production mark, exceeding pipe-line capacity by 25,000 bbl. Operators meet to discuss problem.

Patrick Yorke, active in early drilling operations at Bradford, Pa., and later in West Virginia, Ohio, and Oklahoma, whose inventions and innovations revolutionized oil and gas operations throughout the world, died at his home in Washington, Pa.

Oil operators fight passage by Oklahoma Legislature of proposed Marland Conservation Bill claiming it destructive of property rights.

10 YEARS AGO

Texas Railroad Commission studies prospective proration and conservation program to be adopted in East Texas field when martial-law control is lifted.

Mississippi, where no production of any kind has been found to date, expected to undergo extensive wildcatting program. Many new locations being made for tests.

CHESTER MORRISON, president of Morrison Oil Co., Chelsea, Okla., has been elected president of the Chelsea Chamber of Commerce.

S. G. COULTIS, Calgary, Alberta, Canada, president, Valley Pipe Line Co., has been elected one of the western councilors of the Engineering Institute of Canada.

J. E. SMITH has been appointed subdistrict manager for the Community Natural Gas Co. at Van Alstyne, Tex. He succeeds IVY W. POWELL, who has been transferred to Denison, Tex.

J. P. HOLLE, formerly district production superintendent at Jackson, Miss., for Sinclair Prairie Oil Co., is now superintendent in the East Texas area and makes his office at the company's Troup, Tex., camp.

J. H. LYNCH, tool pusher, and T. W. McSPADDEN, engineer, both of Delta Drilling Co., at Tyler, Tex., have returned from Houston where they attended a 3-day course of study concerned with new developments in rotary drilling mud.

H. J. BOURKE has replaced GEORGE L. MANN as superintendent of the Warren Petroleum Corp.'s Fairbanks, Tex., plant, due to the latter's being called to active military service. Mr. Mann, a lieutenant in the first world war, who saw action in France, is now a major. Mr. Bourke was transferred from the company's Salem, Ill., plant.

VICTOR E. EKHOLM, Dallas, Tex., consulting geologist, left last week by air line for La Paz, Bolivia, where he will take up duties as general manager and chief geologist for the Bolivian Government in its operation of oil properties recently purchased from Standard Oil Co. of New Jersey. Mr. Ekholm was for 8 years associated with Gulf Oil Corp. in Venezuela. Since 1927 he has acted as consultant for Primrose Oil Co. in Fort Worth, Tex.

Many Irons in Fire

E. C. Johnston, Longview, Tex., head of the company which bears his name, is a drilling contractor, producer, refiner, marketer, and transporter of oil. He entered the last-named branch of the industry with the formation of the Johnston Line, Inc., in 1941, putting 6 tow boats and 17 barges in service for the movement of gasoline, kerosene, diesel oil, and distillate via inland waterways to St. Louis, Minneapolis, Chicago, Louisville, and Pittsburgh markets.

E. C. JOHNSTON

Mr. Johnston's career in the industry began in 1916 at Oil City, La., as a roughneck with Higgins Oil & Fuel Co. In 1917 he began drilling for J. S. Abercrombie at Goose Creek, Tex., and 3 years later moved to Burkburnett, Tex., as a driller. In 1925, with E. M. Delk and Curtis Japhet, he formed the National Drilling Co., with headquarters at El Dorado, Ark. Two years later this company was merged with the Arkansas Drilling Co., and he bought his partners' interests. In 1935 the name was changed to E. C. Johnston, with offices permanently located at Longview, for development of properties acquired in the East Texas fields, where he operates 24 producing wells.

As a hobby, Mr. Johnston raises Palomino horses and registered five-gaited and fine harness-class horses on a 5,000-acre plantation in Alabama, which he acquired several years ago. He likewise experiments with Braford cattle, a cross between Herefords and Brahmans. The widely known Whitfield antebellum home on the plantation has been modernized and the wild life, including deer, turkey, and quail, is being protected.

Mr. Johnston was born near the town of Santo in Palo Pinto County, Texas. He is married and has three sons.

W. G. IVERSON, geologist, Continental Oil Co., Midland, Tex., has been transferred to Cuero, Tex., as geologist and core-drill foreman.

T. B. HOSKINS, farm boss, Continent Oil Co., Eunice, N. M., has been promoted to district foreman in the Loco Hills area, New Mexico.

HARRY LEE, engineer for the Railroad Commission at Austin, Tex., has been transferred to Houston, Tex., as petroleum engineer in District 3.

ROY H. SMITH, district foreman, northwest Gaines County, Texas, Continental Oil Co., has been made assistant district superintendent at Wichita Falls, Tex.

FRANK C. SMITH, president of Houston Natural Gas Corp., Houston, Tex., was named first vice president of the Southern Gas Association at the annual convention of the association at Atlanta, Ga., the past week.

FLOYD BRET, formerly district superintendent of production for Sinclair Prairie Oil Co. in the East Texas area, has been made assistant division superintendent and has moved his headquarters to the company's Fort Worth, Tex., offices.

HARRY J. BAUER, president of Southern California Edison Co. and of the Automobile Club of Southern California, as well as being interested in several producing properties, has been reappointed Los Angeles sponsor of the National Recreation Association.

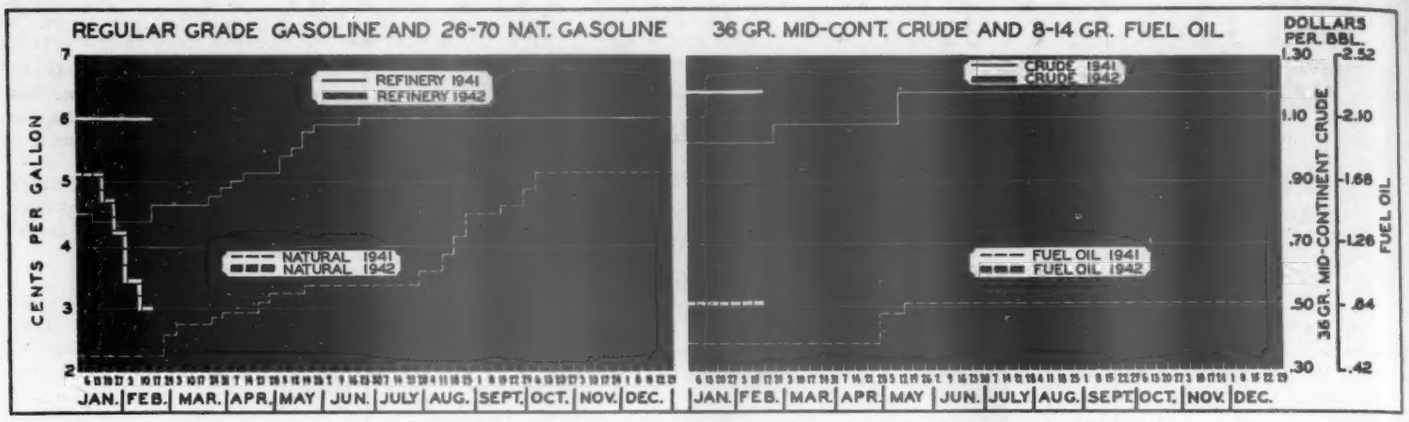
PAUL F. BARNHART, formerly district engineer and assistant production superintendent in the Gulf Coast and South Texas districts for Barnsdall Oil Co., is now associated with Frank and George Frankel, independent producers of Houston, Tex., as petroleum engineer in charge of the operators' production in Texas, Mississippi and Arkansas. Mr. Barnhart attended Texas A. & M. College and received a bachelor of science degree from the University of Oklahoma in 1937.

WILLIAM GRANT, JR., safety engineer, Humble Oil & Refining Co., Houston, Tex.; P. G. MATTHEWS, United Gas Pipe Line Co., Nederland, Tex., and A. G. HELMKE, Standard Oil Co. of Louisiana, Baton Rouge, La., are the oil men on the program of the fourth Southern Safety Conference, which will meet at New Orleans, La., next week.

Shifts: K. W. HALEY, superintendent, Barnsdall Oil Co., Corpus Christi, Tex., to Tulsa; EDDIE REID, drilling superintendent, Arrow Drilling Co., Carmi, Ill., to Shawnee, Okla.; BEN BRADY, drilling superintendent, Arrow Drilling Co., Carmi, Ill., to Shawnee, Okla.; JOHN R. LEONARD, engineer, Socony-Vacuum Oil Co., Inc., Effingham, Ill., to Vernon, Ill.; L. E. ELKINS, engineer, Stanolind Oil & Gas Co., Hutchinson, Kans., to Tulsa; E. MOATZ, Western Construction Co., Kosciusko, Miss., to Sparkman, Ark.; E. L. McCARTNEY, drilling superintendent, Twin Drilling Co., Wichita, Kans., to Grand Haven, Mich.; S. P. WEATHERBY, engineer, Independent Exploration Co., Tulsa, to Houston, Tex.; ALAN B. LEEPER, geologist, Honolulu Oil Corp., Levelland, Tex., to Midland, Tex.; R. G. DALEY, engineer, Shell Oil Co., Inc., Perry, Okla., to Blackwell, Okla.; J. R. LOWELL, JR., Colorado Oil Syndicate, Colorado Springs, Colo., to Colorado Petroleum, Inc., Wichita, Kans.; J. C. HUNTER, superintendent, Falcon-Seaboard Drilling Co., Clarksburg, W. Va., to Weston, W. Va.

C. H. WRIGHT has been reelected president; F. L. MARTIN, vice president in charge of refining and sales; PAUL E. TALIAFERRO, vice president and general attorney; HARRY H. MACK, vice president in charge of production; H. S. McCLINTOCK, vice president and manager of the land and geological departments; W. D. FORSTER, secretary, and L. W. BENNETT, treasurer and assistant secretary, of the Sunray Oil Co., subsidiary of the Sunray Oil Corp., at a meeting of stockholders last week.

PHILIP HAUCK, assistant divisional purchasing agent of the Texas Co., has been appointed divisional purchasing agent of the company for the Pacific Coast division, with headquarters in Los Angeles, Calif. He succeeds C. W. CHANDLER, who has been retired on account of illness after 32 years of service with the company. Mr. Hauck entered the service of California Petroleum Corp. in 1923 as a clerk in the accounting department. Shortly after the California Petroleum Corp. became the Texas Co. in 1928, he was transferred to the purchasing department as price clerk. He was made assistant divisional purchasing agent in March 1940.



MARKET DEVELOPMENTS . . .

East Coast

NEW YORK, Feb. 17.—Measures designed to restrict consumption of oil products along the Atlantic Coast and thus either delay or entirely avoid the necessity for actual rationing are expected to be put into effect within a week. These measures have been placed before federal officials for approval and will probably be made effective immediately after that approval is forthcoming. They are expected to lessen but will not entirely eliminate the extremely tight supply situation that has prevailed since the first of January and therefore will have no effect on prices.

The measures have been proposed to the Office of Petroleum Coordinator in the form of recommendations for relieving the growing East Coast shortage of oil supplies. Since they are a duplicate of steps either taken or proposed when a similar shortage threatened last fall, no delay is anticipated in securing their approval. They are being taken in the hope of being able to avoid cumbersome and expensive rationing programs now in effect in every country at war except the United States.

Measures previously adopted by the industry have contributed materially in slowing up the decline in East Coast reserves but it has still been of sufficient magnitude to indicate that extreme difficulties were in prospect unless additional steps were taken. By increasing the volume of oil brought into the East Coast area by tank car more than 250 per cent during January, the industry has brought the rate of withdrawals of principal refined products down from an average of 2,500,000 bbl. per week in the 3 weeks ended January 24 to an average of less than 1,500,000 bbl. in the 2 weeks ended with February 7. The reduction of slightly more than 1,000,000 bbl. in the week ended February 7 was the lowest of the entire period.

By increasing deliveries from an average of less than 60,000 bbl. per day by tank car early in January to approximately 165,000 bbl. per day at the end of the month, the industry is now supplying approximately 8 per cent of its demand in the East Coast area by rail. The total rail deliveries for January are estimated at 3,100,000 bbl. against a total demand of approximately 45,000,000 bbl.

Mid-Continent

REFINERY gasolines in the Mid-Continent are stiffening slightly as a result of inquiries from several major companies for material to be shipped, it is presumed, by tank car to the East Coast. Some sales are being made, bringing prospects of relief for the market which has been wincing under the pressure of accumulating supplies, with no sales.

Sentence Summaries

MID-CONTINENT: Refinery gasoline and kerosene stiffen. Natural gasolines continue lower. Lubes off.

EAST COAST: Steps taken to ease shortage of oil supplies without rationing. Prices firm.

GULF COAST: Markets confused due to uncertainties of transportation. Supplies pile up.

PACIFIC COAST: Gasoline prices lower. Burner and fuel-oil prices firmer.

PENNSYLVANIA: Lubricating oils steady. Wax prices lower.

Inquiries are extending to various other lines of products, principally kerosenes and some heating oils, which also are being tightened. The stiffening of these products is being reflected in noticeably fewer offerings, which either have been taken up in sales or withdrawn on the prospect of more favorable conditions.

Prices for these products generally are unchanged pending further developments as to the extent of relief afforded from the prospective demand. On the whole, the market continued quiet.

The natural-gasoline situation is becoming increasingly acute with no sales being made and prices sliding off sharply. Quotations the past week dropped another quarter to half cent. Little is in sight to offer any early check in the decline. Heavy accumulations of gasolines on the Gulf Coast have practically closed the doors of the major natural-gasoline outlets.

At the opening of the week 26-70-lb. natural gasolines were being offered freely out of Oklahoma at 3 cents, a new low in latest declining trend. North Texas natural of the same grade was plentiful at 2.5 cents, basis Breckenridge. Other grades were being quoted at relatively low figures. Some observers reported they saw faint signs of slight resistance in several quarters to further declines, but this viewpoint was not generally felt in view of the practically closed market on the Gulf Coast.

Slackened demand for neutral oils and bright stocks is reflected in weakened prices in some grades. Price on 120-125 viscosity "D" bright stock is down 0.5 cent while neutrals are off from 0.5 to 1 cent.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

(Week ended February 7, 1942)

	Dly. crude runs to stills	Stocks: Gasoline	Residual	Gas oil
East Coast	583	19,343	8,573	12,756
Appalachian	148	3,943	566	376
Ind., Ill., Ky.	709	20,798	4,344	3,763
Okla., Kans., Mo.	327	9,567	2,078	1,078
Inland Texas	191	3,560	1,273	120
Texas Gulf	1,031	18,361	9,213	7,697
Louisiana Gulf	160	4,633	2,180	1,519
N. La. and Ark.	80	962	365	73
Rocky Mountains	82	2,190	616	281
California	542	16,866	61,651	12,375
Total Feb. 7, 1942	3,853	100,224	90,859	40,038
Total Jan. 31, 1942	3,848	97,810	91,189	40,674
Total Feb. 8, 1941	3,616	92,511	97,782	37,223

Note: Total refinery runs and product stocks for week ended February 14, 1942, appear on Trends page.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
February 7, 1942	252,366,000
January 31, 1942	250,740,000
February 8, 1941	260,250,000

*Excludes heavy, unrefinable crude in California.

Gulf Coast

HOUSTON, Tex., Feb. 17.—Conversion of all tankers to fuel-oil carriers to bolster declining stocks on the East Coast as ordered by the Office of Petroleum Coordinator, has failed to relieve the acute market situation on Gulf Coast fuel oils, which were expected to be strengthened by the order. On the other hand, the market, not only on fuels but other products, is more confused than ever, and pipe-line proration by major purchasers appears to be the only solution to halt the increasing stocks of crude and all major refined products.

Movement of fuel oils has been held up due to a disagreement among boat owners and shippers as to who is going to pay the 25-cent-per-barrel insurance rate. At the close of the week no agreement had been reached and it is believed that a clarifying order will have to be issued by the petroleum coordinator. It is the opinion of most observers that the rate will be divided equally between both the shipper and boat owner.

While there is little doubt that stocks of fuel oils will be relieved eventually, gasoline stocks continue to back up with little material moving due to the lack of transportation.

It is rumored that several major purchasers are contemplating pipe-line proration which was recently started in the West Texas district by the Atlantic Refining Co. Thus far no other major purchaser has followed suit.

There is a steady demand for lubricants, and all indications point to a tighter market within the next 30 days.

REFINERY AND TANK-WAGON PRICES

(Prices as of February 17)

Refinery Gasoline

Octane (A.S.T.M.):	†80	78	74-76	72-74	68-70	63-66	60 & lower
Mid-Continent*	.....	.....	.....	6.000-6.250	.....	5.625-5.875	5.250-5.500
Pennsylvania	.....	.....	6.750-7.000	.....	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750	§5.000-5.500
Northeast Coast	.....	.....	.....	8.300	8.300	.....	.....
Pacific Coast	.....	7.000-7.500	6.750-6.875	6.500-6.750	6.250-6.500	6.000-6.750	5.000-5.750

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

Natural Gasoline

Grades:	26-70	18-55	75-85(350-375)
Oklahoma (Group 3)	3.000	3.500-3.625	.....
North Texas	2.500	2.875-3.000	.....
North Louisiana	2.625	3.000-3.125	.....
California	.....	.....	4.750-5.000

Kerosene and No. 1 Fuel Oil

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375-4.625	.....
North Louisiana	.....	.....	4.875	.....	.....
Pennsylvania	6.250	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-6.000	4.500
Northeast Coast	.....	.....	.....	5.300	.....
Gulf Coast	.....	.....	.....	3.875	.....

*Basis Oklahoma Group 3.

Tractor, Diesel, and Bunker Fuel Oil

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125	.....	.....	.....	.....	.....
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	$0.85-0.90
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85
Northeast Coast	.....	.....	.....	5.200	2.15	1.35
North Louisiana	.....	.....	.....	.....	.....	†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

Furnace Oil, Gas Oil, Fuel Oil

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.5	3.375	$0.85	$0.85
Pennsylvania (West)	5.625-5.875	5.375-5.875	†5.250-5.500	.....
Northeast Coast	5.2	5.2	1.65-75	1.35
Pacific Coast	5.5	5.5	‡0.85-95	§0.80
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific specification 300. §Pacific specification 400.

Lubricating Oils

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3½	19.50
600-3½	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Wax

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.350-4.550
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250

Neutral Oil

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		38.50
10 pour point		37.50
15 pour point		36.50
25 pour point		31.00
200 vis., at 70° F., 3 color:		
Zero pour point		40.50
10 pour point		39.50
15 pour point		38.50
25 pour point		33.00
NEW YORK—		
Wax in bags fully refined:		
130-132 (A.m.p.) wax		6.250
133-135 (A.m.p.) wax		6.550
Crude scale:		
124-126 (A.m.p.) w.s.		4.350-4.455
124-126 (A.m.p.) y.s.		4.350-4.455

EXPORT PRICES

Gasoline—60-62° Gravity, Maximum 400 End Point

Octane:	72-74	68-70	65-66	60
Gulf Coast	6.500	6.250-6.500	5.875	5.625
Pacific Coast	.....	6.125-6.500	5.875-6.000	5.500-5.625

Distillate and Fuel Oil

	Kerosene 41-43	Diesel fuel 24 G.	Diesel fuel 48-52 D.I.	Diesel fuel 58 D.I.	Diesel fuel Bunkers	Bunker C grade
Gulf Coast	4.000-4.250	.....	4.125-4.375	4.375	$1.65-80	$0.85-95
Pacific Coast	4.750-5.000	1.25-30	.....	....	†1.35-45	*0.85-90

*Pacific specification 400. †Pacific specification 200.

Lubricating Oils

	Neutral oils 200-3	Neutral oils 150-3	Bright and cylinder stocks 200-3	Bright and cylinder stocks 150-3	Bright and cylinder stocks 600&630 S.R.
Mid-Continent	16.8	....	28.8	24.8	.....
Pennsylvania	43-50	41-46	36-37	36-37	26.5-27

GASOLINE AND KEROSENE TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.05	5.50	8.70
Boston, Mass.	14.00	4.50	8.00
Burlington, Vt.	16.00	5.50	...
Buffalo, N. Y.	15.30	5.50	8.30
Dover, Del.	15.80	5.50	10.50
Hartford, Conn.	14.70	4.50	...
Manchester, N. H.	16.40	5.50	9.00
Newark, N. J.	14.30	4.50	7.90
New York, N. Y.	15.20	5.50	8.00
Philadelphia, Pa.	15.30	5.50	10.15
Pittsburgh, Pa.	15.80	5.50	10.50
Portland, Me.	15.40	5.50	8.10
Providence, R. I.	14.10	4.50	7.80
Washington, D. C.	14.30	3.50	9.20
Average 14 cities	15.04	5.07	8.72

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	14.10	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	11.90	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.25	8.00	8.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	15.00	7.00	8.00
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	14.90	5.57	9.44

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	18.50	7.50	10.00
Birmingham, Ala.	19.00	8.50	9.00
Charleston, S. C.	18.05	7.50	...
Charleston, W. Va.	18.35	6.50	11.50
Charlotte, N. C.	19.20	7.50	9.50
Jacksonville, Fla.	18.50	8.50	8.00
Jackson, Miss.	18.00	7.50	9.00
Louisville, Ky.	17.00	6.50	8.50
Memphis, Tenn.	17.75	8.50	10.50
New Orleans, La.	17.75	8.50	*10.50
Norfolk, Va.	16.55	6.50	10.20
Average 11 cities	18.05	7.59	9.67

*Includes 1-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.17	12.83
Average 50 cities	16.14	5.96	9.87
Average last week	16.03	5.96	9.80

Canadian Fields

(Continued from Page 82)

mostly drilled to a gas horizon around 180 ft. have been put down and gas has been piped to Kamsack to service commercial buildings and industries.

In southern Saskatchewan, Zouthern Gas & Development 1, LSD 3, 10-1-13w3, is below 1,000 ft. and will be carried to 3,500 ft. if it fails to get production at less depth. Location is 1 mile north of Bishopric 1 structure test, 1-1-13w3, which got a large gas flow in the Alberta shale.

In western Saskatchewan, Paynton Oil & Gas 1, LSD 13, 29-46-20w3, got several oil and gas shows but encountered water at 1,498 ft. under heavy pressure. Casing is being cemented at 2,060 ft. and preparations are being made to test several promising horizons.

Oil & Gas Development Co. of Moose Jaw is planning two tests in the Lloydminster area this season and one at Muddy Lake. Northwest Co., subsidiary of Imperial Oil, will continue survey work on an extensive area in southern Saskatchewan and will drill one or more deep tests. Bobjo Mines is continuing structure testing in southeastern Saskatchewan, chiefly north and west of Kisbey and near Manor, preparatory to commercial testing.

Crude-Oil Prices

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Smackover, Arkansas, heavy	.83
Illinois basin	1.37
Pecos County, Texas	.95
Lance Creek, Wyoming	1.12
Bradford, Pennsylvania	2.75

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity	Signal Hill Calif.	Oklahoma, Kansas	Gulf Coast, Texas	West Texas, Lea County, N.M.
18-18.9	$0.80	.....	.....	.....
19-19.9	.84	.....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

International News

(Continued from Page 29)

Since Japan's prewar imports exceeded her domestic requirements, since her large merchant fleet bunkered as much as possible in foreign ports, leaving the excess at home and since she insisted that foreign oil companies maintain at least 6 months' supply it is obvious that she has been acquiring substantial stocks. However, I refuse to guess what Japan's stocks may have been at the outbreak of the war.

Russian Production Increased Despite Severe Handicaps

By BASIL B. ZAVOICO
Chase National Bank

GERMAN occupation of major Russian industrial areas and the necessity of limiting remaining industries to war production forced the Soviet oil industry to rely entirely on itself, its own very limited manufacturing facilities, extensive repair shops and probably virtually unlimited quantities of used equipment. Unable to blame delays on other industry, the oil industry reclaimed old or unused equipment, often only slightly defective, awaiting some small parts from central Russian factories. In this it did a thorough job. Pipe formerly brought down from central Russia was substituted by reclaimed casing from old or submarginal wells which provided an ample reserve. This obviated former delays when wells were drilled but not completed due to lack of new pipe. Special training courses started with the outbreak of war have made possible the substitution of women for male workers and technicians. Under this great handicap production was increased without sacrifice in quality, reports indicating the availability of ample supplies of high-octane gasoline and good quality lubricating oils.

CRUDE-OIL PRODUCTION IN RUSSIAN OIL FIELDS

	1940		1941	
	Thous. of bbl.	Per cent	Thous. of bbl.	Per cent
Baku	161,000	72.3	172,500	71.2
Grozny-Dagestan	13,500	6.0	13,500	5.6
Kuban	17,000	7.7	15,000	6.2
Total Caucasus	191,500	86.0	201,000	83.0
Ural-Volga	18,000	8.3	27,500	11.3
Emba	3,750	1.7	4,500	1.9
Central Asia	5,600	2.5	6,000	2.5
Sakhalin	3,250	1.5	3,250	1.3
Total	222,600	...	242,250	...

Peruvian Exploration Activity Normal in 1941

By O. B. HOPKINS
Chief Geologist, International Petroleum Co., Ltd.
(Author absent; paper read by chairman)

EXPLORATION in Peru in 1941 was normal though there were indications that restrictions as the result of the war might curtail future programs. Such restrictions applied both to suitable men and to equipment.

A Cretaceous deep test drilled at La Brea-Parinas by International Petroleum proved dry at 9,781 ft. Seven semiexploratory wells here added three small extensions. Lobitos Oilfields on the concession immediately north was reported to have pursued normal wildcatting and the Peruvian Government did a small amount of such drilling on or near the old Zorritos field. Developments in the Pirin area near Lake Titicaca were of a very minor nature.

In eastern Peru drilling was confined to Cia. Ganso Azul's Agua Caliente structure near Pachitea, the first and only producing area in eastern Peru. Two and possibly three new wells, located to delimit the producing area, resulted in one small producer and a noncommercial well. There were no changes in existing leases.

The government completed a 1,000-bbl. per day refinery at Zorritos. This refinery processes the 150-bbl. per day production of the Zorritos field and also royalty oil from Lobitos Oilfields. Cia. Ganso Azul is building a topping plant of 500-bbl. per day capacity and is considering the construction of a pipe line to Pucalpa on the Ucayali River. It has been reported to have contracted for the delivery of 1,200 bbl. of crude oil per day to a Brazilian concern.

Venezuelan Production Sets Record in December

VENEZUELAN production rose nearly 7 per cent during December, with the result that a new high record was attained. The bulk of the increase was from the Lake fields with Tia Juana providing the largest jump and Bachaquero the largest percentage increase. The December rate of 734,990 bbl. a day was 23,128 bbl. above the November rate.

A sharp contrast between 1940 and 1941 appeared when production slowly declined to a low of 425,062 bbl. in December. The increase of 73 per cent during the past year followed the closing of the Mediterranean and consequent cessation of movement of Iranian and Iraqi oil to Europe. It is quite possible that production will not increase greatly above the present rate as exports declined from 621,064 bbl. a day in November to 614,903 bbl. in December. Exports from Maturin and Barcelona increased slightly, but this rise was more than offset by the decline in exports from Maracaibo, the principal port of the Lake area.

VENEZUELAN CRUDE-OIL PRODUCTION

By Fields

	December 1940	November 1941	December 1941
Cabimas	1,183,195	2,015,375	2,119,470
Lagunillas	3,052,330	6,360,635	6,535,890
Tia Juana	2,712,155	5,457,790	5,832,480
Bachaquero	161,025	254,760	431,165
Total Lake fields	7,108,705	14,088,560	14,919,005
Daily average	229,313	469,619	481,258
La Concepcion	59,870	114,205	107,810
La Paz	40,345	28,765	30,560
Mene Grande	898,825	1,135,335	1,220,855
El Cubo	404,115	545,505	624,280
Cumarebo	88,005	172,005	177,265
Las Palmas	1,665	2,600	2,165
El Mene de Mauroa	20,450	17,670	18,285
Hombre Pintado	51,405	40,970	41,085
Distrito Mara	...	...	910
Quiriquire	1,905,350	1,538,665	1,667,540
Pedernales	139,300	125,770	129,090
Temblador	334,930	263,875	270,580
Oficina	1,651,285	1,981,300	2,095,780
Jusepin	258,005	802,095	950,760
Santa Ana	415	17,435	17,090
San Joaquin	126,305	284,370	289,575
El Roble	80,060	163,645	178,590
Leona	2,520	11,705	12,140
Guario	2,110	5,360	7,280
Santa Rosa	...	11,990	16,810
Santa Barbara	...	4,040	3,075
Los Coritos	1,785	...	4,115
Anaco	...	...	15
Socorro	1,490	...	...
Other fields	6,068,225	7,267,305	7,865,655
Daily average	195,749	242,243	253,732
Grand total	13,176,930	21,355,865	22,784,660
Daily average	425,062	711,862	734,990

By Companies

	December 1940	November 1941	December 1941
Caribbean Pet. Co.	898,825	1,135,335	1,220,855
Venezuelan Oil Con.	2,711,745	5,123,740	5,471,365
Colon Dev. Co.	404,115	545,505	624,285
Lago Pet. Corp.	2,806,015	7,643,295	8,074,160
Mene Grande Oil Co.	3,562,695	3,735,715	3,911,905
British Con. Oilfields	20,450	17,670	18,285
Central Area Exp. Co.	51,405	40,970	41,085
Standard of Venezuela	2,694,265	3,092,460	3,393,005
Cia. de Petroleo Lago	23,520	11,755	14,325
Socony-Vacuum Oil Co.	2,110	5,360	7,295
Cia. Consolidated de Petroleo	...	...	3,070
Texas Co. (Venezuela)	1,785	4,040	4,115
Orinoco Oil Co.	...	...	910
Grand total	13,176,930	21,355,865	22,784,660

VENEZUELAN PETROLEUM EXPORTS

From Maracaibo

Shipper and destination—	November 1941	December 1941
Caribbean Pet. Co., Curacao	126,265	144,570
Venezuelan Oil Con., Curacao	4,895,845	5,208,545
Colon Dev. Co., Curacao	512,095	571,645
British Con. Oilfields, Curacao	17,695	24,285
Central Area Exp., Curacao	38,475	36,095
Lago Pet. Corp., Aruba	6,783,565	6,851,355
Las Piedras	624,090	279,360
Mene Grande Oil Co., Las Piedras	1,456,575	1,590,430
Aruba	19,765	19,665
Standard of Venezuela, U. S.	261,690	55,300
Guiria	...	35,075
Total from Maracaibo	14,755,800	14,819,325
Daily average	491,860	478,043

From Maturin

Standard of Venezuela, Aruba	179,615	272,020
Guiria	183,415	320,700
Canada	463,155	172,325
United States	185,815	353,210
Tenerife	...	175,800
Argentina	364,520	245,515
S.O.V.-Lago-Mene Grande (from Baca de Uracoa), Guiria	262,120	260,580
Total from Maturin	1,638,700	1,800,150
Daily average	54,623	58,069

From Barcelona

S.O.V.-Mene Grande, U. S.	1,463,585	1,396,035
Aruba	374,440	570,285
Curacao	399,400	476,195
Total from Barcelona	2,237,425	2,442,515
Daily average	74,581	78,791
Grand total Venezuela	18,631,925	19,061,990
Daily average	621,064	614,903

Athabaska Sands in Canada May Contain 300,000,000,000 Bbl.

By MAX BALL
President, Abasand Oils, Ltd.

THE Athabaska tar sands are reported to contain more oil than all the rest of the world. Official Canadian estimates place the minimum at 100 billion barrels while others range as high as 350 billion barrels. However, only one-half to 1 billion barrels is now considered of economic importance since that represents the volume that can be reached now. The rest underlies 800 to 1,500 ft. of Cretaceous sand or shales which would not in themselves provide a roof and extensive timbering would be required. The sands are available only where the Athabaska River has cut down and exposed them, and the only presently workable deposits are those which can be handled by open-mine methods.

The oil is described as a virgin oil converted just beyond the asphalt stage. It is viscous, heavy and tarry, contains few light ends and no gasoline. However, at moderate temperatures and times (685° F., 30 minutes) it can be converted by the digestion process from its original A.P.I. gravity of 10° to 22°. Evidence that the oil is not cracked in this process is contained in the fact that there is no carbon residue, and the whole crude is transferred. Following the digestion process the crude is refined conventionally. It has a maximum gasoline yield then of 43 to 45 per cent though in the little topping plant in which it is processed the yield is about 30 per cent.

The oil is found as a film enveloping each grain of sand. The sand is run through a pulper with hot water (200° F.) and the pulp of sand, water and oil is run to a quiet zone flotation cell and the oil drawn off. The oil which does not emulsify is mixed with crude naphtha which lowers the viscosity and permits the sand and water to settle out. This oil is taken through an absorber to the refinery which now has a capacity of 400 tons per day. Products include the gasoline which has a high octane rating of 66 compared to 56 for gasoline from Turner Valley crude. The gasoline is high in sulfur but the sulfur is extremely stable and appears to be noncorrosive. High-quality diesel fuel is obtained as well as some of the most desirable asphalt produced. Half the refinery was destroyed by fire last November but it will be rebuilt and is expected to be in operation again by April. At the same time the capacity is being increased 50 per cent.

Last fall shooting was utilized for the first time. It caused a pronounced change in the characteristics of the sand. Shooting apparently not only broke the oil bonds but also prevented reconsolidation of the sand. It was then possible to handle the free sand and a power shovel was introduced. In the future the process will consist simply in shooting the sand, shoveling it into carryalls and transporting it to the rotary pulper.

EQUIPMENT PROGRESS...

Weco Announces Addition Of Valve-Repair Service

Well Equipment Manufacturing Corp., Houston, Tex., announces to the oil and refining industries that it is now completely equipped to thoroughly repair or rework plug valves. The new service includes bronze, chrome, and steel plating.

The same process is used in chrome plating repaired valves as is used in plating new valves. Every valve goes through a standard routine, which when completed is backed by a new valve guarantee.

After repair the repaired valves are thoroughly tested by the Weco inspection department.

Well Equipment Manufacturing Corp., Houston, Tex., announces the Weco (L&M) V-belt rubber shock absorbers for use on the small, or driving, pulley of any V-belt hookup.

This product is specifically designed to minimize wear on V-belts and the grooves of the V-belt pulleys.

By providing proper support for the belt and giving it a cushioning effect, the manufacturer states that this shock absorber is materially increasing V-belt life.

The object of and benefit gained by using a V-belt is to make the belt pull by its sides. However, in its travel around the pulley, the belt has a natural flex, or sag, in the middle. The more pull or shock the belt receives, the greater this flex, or sag.

The purpose of the new Weco V-belt rubber shock absorber is to fill the open space between the bottom of the pulley groove without sacrificing any of the driving effectiveness. Thus, by preventing the vicious cycle of new belt and old pulley or new pulley and old belt working against each other to cause undue wear, this shock absorber removes the one V-belt weakness.

Belt slippage, the cause of many oil-field fires, is eliminated, the manufacturer states, because the V-belt cannot slip when it is traveling on a Weco V-belt rubber shock absorber.

Pomona Pump Acquires Westco Plant and Line

Pomona Pump Co., widely known as manufacturer of vertical pumps, announces the purchase of the Westco Pump Division of Micro-Westco, Inc., Bettendorf, Iowa.

The newly acquired business will be operated as Pomona Pump Co., Westco Division, at 2621 Locust Street, St. Louis, Mo., and manufacture continued from the St. Louis plant of the Pomona Pump Co. Management and key personnel of Westco will be transferred to St. Louis to continue the manufacture and distribution of the complete line of Westco pumps through the same national organization which has been carefully built up by Westco over the past 16 years.

Addition of the well-known Westco turbine-type pump for industrial and marine application, also boiler feed and condensation units, side-suction centrifugals, complete water systems, line and cellar drainers, rounds out the line of Pomona deep-well low-lift, industrial, marine and municipal pumps. During the last few years Pomona has added the Little Chief turbine pump and also Pomona deep and shallow well jets.

Waterfog Nozzle Designed For Fighting Incendiaries

The latest Rockwood product, the Rockwood N-20 Waterfog nozzle, has been offered by the Rockwood Sprinkler Co., 38 Harlow Street, Worcester, Mass.

When incendiaries strike, industrial plants will need a quick, easy extinguisher. The N-20 generates Waterfog (just ordinary water but broken up into such small particles that there is no chance of causing a violent explosion of molten metal, such as a straight stream or coarse spray would produce, if directed at an incendiary bomb). Waterfog safely accelerates the burning, bringing about consumption in a few minutes.

No special skill is needed. The Rockwood N-20 starts generating Waterfog the second it is turned on. The operator is using a familiar extinguishing agent. He has no fear of running out of it at the crucial moment.

TRADE LITERATURE

MACWHYTE CO., Kenosha, Wis. — "Ropeology," a new bulletin to help wire-rope users and keep them informed.

LA PLANT-CHOATE MANUFACTURING CO., INC., Cedar Rapids, Iowa. — A new complete equipment booklet describing the firm's earth-moving, land-clearing, and snow-removal equipment. Each model is described generally, with explanations as to size and capacity.

AMERICAN DISTRICT STEAM CO., North Tonawanda, N. Y.—Bulletin 35-15B, on the Adsco pistonring type, Model A expansion joint, which can be unpacked and repacked under full operating pressure without interruption to service. Details of construction, dimensions, specifications, etc., are given in the bulletin on this joint which is made in sizes from 2 to 20 in. for all pressures up to 400 lb.

AMONG EQUIPMENT MEN

Navy "E" Pennant Given to Roebling

During ceremonies at the presentation of the Navy "E" Pennant to the John A. Roebling's Sons Co., Trenton, N. J., Lt. Comdr. Warren A. Shaw, U. S. N. Bureau of Ordnance, tossed a finger ring made from a German incendiary bomb into one of the open-hearth steel furnaces in the Roebling company's Roebling, N. J., plant, " . . . to return it to the Axis powers by the fastest means of transportation known."

The melt of steel into which the ring was thrown will be used by Roebling in the manufacture of aircraft control cords and cables for the armament program. The ring was made from an unexploded incendiary bomb dropped by the Germans on London.

Later that evening Commander Shaw presented the U. S. Navy Bureau of Ordnance Flag and the Navy "E" Pennant, highest service award of the Navy to William A. Anderson, president of the John A. Roebling's Sons Co., and Navy "E" buttons to Roebling employes.

Maintenance Engineering Elects New Secretary-Treasurer

C. W. Gautier has been elected secretary-treasurer of Maintenance Engineering Corp., Houston, Tex., and placed on the board of directors of the company. His election follows the death January 14 of L. J. Burda, whose position he has filled through the latter's extended illness. Mr. Gautier joined the Maintenance Engineering staff 14 years ago.

Series of Promotions Made By Caterpillar Tractor

Elevation of Harmon S. Eberhard to a vice presidency of Caterpillar Tractor Co., Peoria, Ill.; creation of a new research department headed by C. G. A. Rosen; promotion of G. E. Burks to chief engineer; J. R. Munro to general factory manager and Charles A. Woodley to factory manager of the tractor division, have been announced by L. B. Neumiller, president of the company.

The changes followed the sudden death, January 23, of Thomas John Connor, vice president.

Mr. Eberhard, who was named chief engineer in charge of all engineering activities of Caterpillar in 1933, now has administrative direction of research, engineering, manufacturing, industrial relations and training.

McLaine Appointed Director of Public Relations

The appointments of W. Everett McLaine as director of public relations and Edward C. Myers as assistant director of public relations for United States Steel subsidiaries in the Pittsburgh district were announced in Pittsburgh. At the same time it was stated that Walter E. Camp will become assistant to J. Carlisle MacDonald, assistant to the chairman of the board of directors of United States Steel Corp. in New York, who, for the chairman of the board of directors, exercises general direction of public relations activities of the corporation and its subsidiary companies. The appointments are effective February 16, 1942.

The public relations offices for the Pittsburgh district will be located at 436 Seventh Avenue.

Rubber Association Board Elects New Member

Harry E. Smith, general manager of the Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., was elected a member of the board of directors of the Rubber Manufacturers Association, Inc., at a recent meeting of the board. Mr. Smith replaces F. L. Curtis, former general manager of the Manhattan Division, who resigned.

W. L. James Addresses Nomads

W. L. James, who is associated with the Procurement Division of the War Production Board, was the speaker at the monthly luncheon of the Tulsa Nomads, February 16. Mr. James, who is on leave from his duties as head of the purchasing department of the Stanolind Oil & Gas Co., has been in Washington since September 1941.

CLASSIFIED ADVERTISING

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FOR LEASE, potential oil lands on Beaver Creek Structure near Havre, Mont. Now producing gas. See U. S. G. S. Bulletin 641CC. Address Box 505, Havre, Mont.

WE HAVE mineral and oil royalties on 4,000 acres of land in Oklahoma. Would like to lease this to a driller. If interested, write the ALTO OIL AND INVESTMENT COMPANY, CHEROKEE, IOWA.

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WESTERN Kans. & Eastern Colo. 100,000 acres for lease or sale. Terms. Write Owner. John W. Baughman, Liberal, Kans.

CHEAP CRANE COUNTY Sec. 18, B28, under Magnolia-Stanolind leases. Jefferson G. Smith, 215 Littlefield Bldg., Austin, Tex.

Ranches and Farm Lands

OZARK Farm, 110 A. near Rogers, Ark. 2 Sets improvements, good condition, 11 acres fruit. Suitable for chickens, cattle, horses. Good water and electricity. Owner, 4-5745, Tulsa, Okla.

For Rent

FOR RENT: Office space and warehouse facilities for oil field specialty company. Location center of Supply Row. Miller Sand Pump Company, Kilgore, Texas.

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OIL REFINERIES
BLAST FURNACES
STEEL PLANTS
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LOANS made on producing oil, gas and mineral lands. New York Note & Share Corp., 109 Broad St., New York City.

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Will sell for cash, terms or lease to responsible parties.

Sale made necessary by calling of operating head into armed forces.

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Skimming and Cracking Plant Equipment
Pumps—Fittings—Towers, Etc.
Write P. O. Box 218 or Phone 99
Nathan Pipe & Supply Co., Inc.
Overton, Texas.

TWO Murphy Diesel Engines 150 HP. each slightly used, excellent condition. For Sale f.o.b. Houston. 525 Waggoner Bldg., Wichita Falls, Texas.

OKLAHOMA CITY alloyed once run ⅞ & 1" sucker rods
MIKE TRAVIS, 1702 S. Boulder,
Phone 2-2447, Tulsa, Okla.

FOR SALE at Bartlesville: 1 model 1312 photostat machine. Complete $750. Patridge, Cities Service Oil Co., Bartlesville, Okla.

WANTED—Used Oil Country boilers. Write us giving complete specifications, condition and location. Lucey Products Corp., Tulsa, Okla.

FOR SALE: Wilson-Mogul Drawworks with water cooled brakes and 100 H.P. International Motor. Melton Supply Co., Seminole, Oklahoma.

FOR SALE: Mast Type casing pulling machine, 50 ft. mast, complete drawworks, perfect working shape. Degen Pipe & Supply Co., 401 N. Boston, Tulsa, Okla.

WESTINGHOUSE Turbine—115 H. P. at 85 lbs. Steam Pressure—Expansion Pressure 5 lbs.—1750 R.P.M. Turbine No. 11,133. Write to James C. Martin, Nixon Building, Corpus Christi, Texas.

TRACTORS

Caterpillar, crawler type, size "35" $495; size "65" with nigger head winch $895; Austin Western hydraulic grader 10' blade $650. O. C. Evans, Mt. Sterling, Kentucky

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FOR SALE: 6 x 16 Wilson-Snyder Power Slush Pump. Melton Supply Co., Seminole, Okla.

FOR SALE near Wewoka, Oklahoma: 2—80 H.P. Type V Foos Gas Engines complete in good operating condition. Patridge, Cities Service Oil, Bartlesville, Okla.

FOR SALE at Bartlesville: 15 oak drafting tables, $35 each. Patridge, Cities Service Oil Co., Bartlesville, Okla.

IMPROVED N Sullivan Core Drill, good condition; priced to sell. Healdton Machine Tool Co., Healdton, Okla.

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With Engineering Service
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FOR SALE: 3—100 H.P. Clark Engines with direct connected compressors. Can be used for Drilling Engines. 190 H.P. Miller Gas Engine direct connected compressors. Triplex and Duplex Pumps. A. C. Askew, Box 3073, Whittier Sta., Tulsa, Okla.

FOR SALE: 125 H.P. 200 W.P. Broderick Boiler, Code Condition, $975. Melton Supply Co., Seminole, Okla.

FOR SALE

20,000' 12¾" O.D. lapweld pipe.
5,000' 7", 24 lb. seamless casing.
5,000' 2½" seamless upset tubing.
300 sets 3" tool joints, full hole.
200 sets 3" full hole tool joints.
Both steam and power drilling rig. A complete line of drilling and pumping equipment.

Wire, write, or phone the

Louisiana Iron & Supply Company
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FOR SALE
Located one-half mile south of Shidler Oklahoma.

3—190 HP. Type 3, New Watts-Miller twin gas engines, complete, with two-stage compressors, direct connected.
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3—190 HP. Type 3, New Watts-Miller twin gas engines, not complete.
2—70 HP. New Watts-Miller, Overhead belt-driven auxiliary engines.
Large quantity of new, unused extra parts for 190 HP. New Watts-Miller Engines and Compressors; bearings, pistons, rings, valves, etc.
1—steel building, 222' long x 32' wide.
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A number of steel buildings with wood frames.
Large stock of fittings, from 2" including 16", mostly screw.
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2—size #6 and 1—size #3 A. C. Cemron Centrifugal Pumps.
1,000' of mesh wire fencing, with barbed wire extensions on top.
2—75 HP. Chicago Pneumatic Engines and Compressors, located near Wewoka, Oklahoma.

If interested, please write
KAHAN PIPE & SUPPLY CO.
P. O. Box 682, Tulsa, Oklahoma
or call 4-6537, Tulsa, Oklahoma.

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MARINE TYPE BOILERS

2—SCOTCH MARINE 180 HP 150# W.P. Boilers complete with Dutch oven, steel building, fire brick, all header connections and stack. In first class condition.

Louisiana Iron & Supply Co.
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FOR SALE: 1 Motor driven rotary drilling rig; suitable for 6,000 ft. work. Melton Supply Co., Seminole, Oklahoma.

WE CARRY a full line of Drilling and Fishing Tools, Stems, Bits, Spiders, Slips, everything in the drilling line. Degen Pipe & Supply Co., 401 N. Boston, Tulsa, Okla.

FOR SALE: 1 Ft. Worth Spudder, 2500 ft. capacity, and 1 Star Spudder, 4,000 ft. capacity. Both machines now drilling out of Tulsa. O. B. Hausam, 4203 S. Madison, Tulsa. Phone 4-4288.

FOR SALE at Oklahoma City: 1—100 H.P. Kewanee 200# W.P. oil field type boiler. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE
1—Complete Std. drilling rig consisting of:
1—122' Emsco Angle Iron Derrick with 5" re-legs, Steel band wheel, steel bull wheel, steel calf wheel, Parkersburg sand reel.
1—Steel front with steel walking beam.
1—13¼ x 16 Reid twin diesel engine with OCS Jack shaft and clutch mounted on skids.
Above in first class condition having drilled but one well 6500' deep.
Also 1—122' angle iron used Lee C. Moore steel derrick.
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Ft. Worth, Tex., Phone 2-1204.

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FOR SALE: International Diesel Motor U.D.-18. Almost new, complete with outboard bearing, pulley and belts. Adair-Morton Company, Wichita, Kansas.

FOR SALE: Surplus equipment, 4 Star Drilling Machines—4 Pipe Threading Machines. Also second-hand pipe, casing and oil and gas well supplies. Lee Morrison Supply Co., Bartlesville, Okla. Tulsa Representative phone 4-3355.

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3— 5,000 Bbl.
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2— 750 Bbl.
2— 600 Bbl.
2— 1,200 Bbl. Agitators.

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2280 Woolworth Bldg.
New York, N. Y.
Tele—Cort. 7-4676

LUMP close-out of Oil Field Transmission. Write for items and price. C. M. Baker, Waterloo, Iowa.

FOR SALE: Dayton-Dowd 6" x 8" Centrifugal with 30 hp., 220 volt motor, 1000 gpm., 90 ft. Deep Well Turbine, 60 gpm., 270 ft. with motor or belt drive. Worthington 4" high pressure rotary. Two belt driven two stage air compressors 340 ft. and 368 ft. at 120 pounds. Bruce-McBeth engine driven 50 KW., 220 volt generator with exciter. 9" x 10" Vertical Single acting triplex plunger pump.

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4—320 HP Babcock & Wilcox Stirling type water tube boilers, Class S No. 16 with oil burners, 304 3¼" OD boiler tubes. Last insurance inspection Jan., 1940 approved for 150 lbs. working pressure. One complete set of new tubes for one boiler.

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Journalisms:

JAMES E. HALFERTY, who authors the piece "Basic Principles of Closed-Type Flow-Valve Installations" on Page 40 of this issue, has had an interesting career in the oil industry since graduating from Carnegie Institute of Technology with a degree in civil engineering in 1934. He worked for Gulf Oil Corp. in Crane, Tex., for 3 years as roustabout, roughneck, general apprentice engineer and land and lease scout. He then moved to Odessa, Tex., where he became district production engineer, a position he recently resigned to go into consulting engineering work, specializing on gas lift. Mr. Halferty now headquarters in Los Angeles, Calif.

•

SEVERAL weeks ago we got a letter from an oil man who now holds the rank of major in the U. S. Field Artillery, inquiring as to the tools and methods available for overcoming trouble encountered while drilling water wells at the Army post. The question was immediately answered in considerable detail.

His letter thanking us for the trouble we'd gone to was received last week but what pleased us most was the expression of confidence in the last paragraph, which said, "I always knew that I could go to The Oil and Gas Journal when I wanted any information."

•

THE Engineering and Operating Section of the Journal next week will include a page of "Pipe-Line Suggestions," a collection of short items depicting new ideas and methods of operation, maintenance and construction. These are always of interest to the pipe-line reader as he can generally convert them to his own use or apply the ideas to his own job.

Paul Reed, the Journal's pipe-line editor, gathers the suggestions as he visits the nation's oil arteries and the men in charge of them.

•

THERE is a natural succession of events in field development which has prevailed since the drilling of the first well. Immediately after the operator gets a pipe-line connection and starts running oil, he begins to make plans for the disposal of the salt water.

The Tinsley field, Mississippi's first oil pool and the only major one in the state, has been producing considerable water but until recently operators were able to get rid of it in evaporation pits. Now, one company has put into operation a subsurface system which uses the Wilcox sand as a disposal zone.

The venture was more successful than anticipated as the well has enough vacuum on it to siphon the water into the casing from a storage tank located about 30 ft. below the well head. Just to add a little mystery, Wilcox water can be produced through the tubing while water separated from the oil is being injected through the casing.

CALENDAR

February

INDUSTRIAL SAFETY SECTION, fourth annual safety conference, Roosevelt Hotel, New Orleans, La., February 22-24.

AMERICAN PETROLEUM INSTITUTE, Division of Production, southwestern district, spring meeting, Adolphus Hotel, Dallas, Tex., February 26-27.

NORTH TEXAS OIL AND GAS ASSOCIATION, Wichita Falls, Tex., February 28.

March

AMERICAN SOCIETY FOR TESTING MATERIALS, committee week and spring meeting, Cleveland, Ohio, March 2-5.

INDIANA INDEPENDENT PETROLEUM ASSOCIATION, spring convention and refiners and suppliers exhibit, Hotel Severin, Indianapolis, Ind., March 3-5.

AMERICAN PETROLEUM INSTITUTE, Division of Production, Pacific Coast district, spring meeting, Biltmore Hotel, Los Angeles, Calif., March 10.

WISCONSIN PETROLEUM ASSOCIATION, annual convention and equipment show, Schroeder Hotel, Milwaukee, Wis., March 18-20.

OKLAHOMA UTILITIES ASSOCIATION, annual convention, Biltmore Hotel, Oklahoma City, Okla., March 23-24.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, spring meeting, Houston, Tex., March 23-25.

AMERICAN PETROLEUM INSTITUTE, Division of Production, Mid-Continent district, Mayo Hotel, Tulsa, March 26-27.

April

AMERICAN PETROLEUM INSTITUTE, eastern district, Division of Production, William Penn Hotel, Pittsburgh, Pa., April 9-10.

MIDWEST POWER CONFERENCE, annual meeting, Palmer House, Chicago, Ill., April 9-10.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Cincinnati, Ohio, April 15-17.

NATIONAL PETROLEUM ASSOCIATION, thirty-ninth semiannual meeting, Cleveland, Ohio, April 16-17.

AMERICAN CHEMICAL SOCIETY, 103rd meeting, Memphis, Tenn., April 20-24.

SOUTHWESTERN GAS-MEASUREMENT SHORT COURSE, Norman, Okla., April 21-23.

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, twenty-seventh annual meeting, Cosmopolitan Hotel, Denver, Colo., April 21-24.

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, Washington-Youree Hotel, Shreveport, La., April 22-24.

May

AMERICAN GAS ASSOCIATION, thirty-seventh annual natural-gas convention, New Orleans, La., May 4-7.

NATURAL GASOLINE ASSOCIATION OF AMERICA, Mayo Hotel, Tulsa, May 13-15.

NATIONAL ASSOCIATION OF PURCHASING AGENTS (oil-company buyers' group), Waldorf-Astoria Hotel, New York City, May 25-28.

June

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, semiannual meeting, Cleveland, Ohio, June 8-11.

AMERICAN SOCIETY OF TESTING MATERIALS, Chalfonte-Haddon Hall, Atlantic City, N. J., June 22-26.

October

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, fall meeting, Rochester, N. Y., October 12-14.

November

AMERICAN PETROLEUM INSTITUTE, twenty-third annual meeting, Stevens Hotel, Chicago, Ill., November 9-13.

December

PETROLEUM ACCOUNTANTS SOCIETY OF OKLAHOMA, Hotel Mayo, Tulsa, December 17.

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